

AMERICAN JOURNAL OF OBSTETRICS AND GYNECOLOGY

ADVISORY EDITORIAL BOARD

FRED L. ADAIR
BROOKE M. ANSPACH
WILLIAM T. BLACK
JAMES R. BLOSS
LUCIUS E. BURCH
WALTER W. CHIPMAN
WILLARD R. COOKE
HARRY S. CROSSEN
THOMAS S. CULLEN
ARTHUR H. CURTIS
WILLIAM C. DANFORTH
WALTER T. DANNREUTHER
CARL H. DAVIS
JOSEPH B. DELEE

ROBERT L. DICKINSON
PALMER FINDLEY
C. FREDERIC FLUHMANN
ROBERT T. FRANK
JOHN R. FRASER
WILLIAM P. HEALY
F. C. IRVING
FLOYD E. KEENE
JENNINGS C. LITZENBERG
FRANK W. LYNCH
JAMES C. MASSON
JAMES R. MCCORD
NORMAN F. MILLER
CHARLES C. NORRIS

EMIL NOVAK
EVERETT D. PLASS
ISIDOR C. RUBIN
JOHN A. SAMPSON
OTTO H. SCHWARZ
H. J. STANDER
FRED J. TAUSSIG
PAUL TITUS
WILLIAM H. VOGT
GEORGE GRAY WARD
RAYMOND E. WATKINS
BENJAMIN P. WATSON
PHILIP F. WILLIAMS
KARL M. WILSON

OFFICIAL ORGAN

THE AMERICAN GYNECOLOGICAL SOCIETY; THE AMERICAN ASSOCIATION OF OBSTETRICIANS, GYNECOLOGISTS, AND ABDOMINAL SURGEONS; NEW YORK OBSTETRICAL SOCIETY; OBSTETRICAL SOCIETY OF PHILADELPHIA; BROOKLYN GYNECOLOGICAL SOCIETY; ST. LOUIS GYNECOLOGICAL SOCIETY; NEW ORLEANS GYNECOLOGICAL AND OBSTETRICAL SOCIETY; BALTIMORE OBSTETRICAL AND GYNECOLOGICAL SOCIETY; CHICAGO GYNECOLOGICAL SOCIETY; CENTRAL ASSOCIATION OF OBSTETRICIANS AND GYNECOLOGISTS; AMERICAN BOARD OF OBSTETRICS AND GYNECOLOGY; WASHINGTON GYNECOLOGICAL SOCIETY; PITTSBURGH OBSTETRICAL AND GYNECOLOGICAL SOCIETY

EDITORS

GEORGE W. KOSMAK HUGO EHRENFEST

ASSOCIATE EDITORS

HOWARD C. TAYLOR, Jr. . . WILLIAM J. DIECKMANN

VOLUME 31

JANUARY—JUNE, 1936

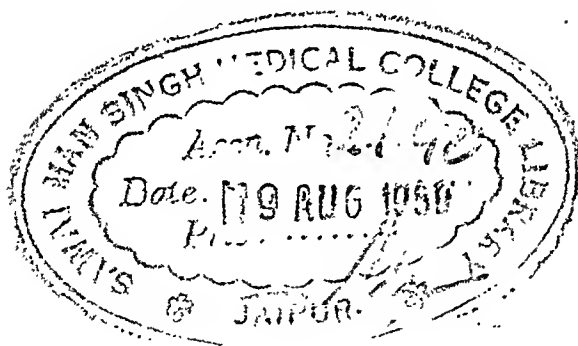
ST. LOUIS

THE C. V. MOSBY COMPANY

1936

Copyright 1936, by the C. V. Mosby Company
(All rights reserved)

(Printed in U. S. A.)



Press of
The C. V. Mosby Company
St. Louis

American Journal of Obstetrics and Gynecology

VOL. 31

JANUARY, 1936

No. 1

ANNOUNCEMENT

FIFTEEN years ago the AMERICAN JOURNAL OF OBSTETRICS AND GYNECOLOGY was launched as a successor to the American Journal of Obstetrics and Diseases of Women and Children, which had pursued an honorable and uninterrupted career of publication since 1868. The Great War as well as other factors had forced the suspension of the latter and left a hiatus with no medium devoted exclusively to this branch of medicine. The task of supplying the need for a journal to encompass the specialty seems to have been well met by the present publication, although the growth and interest of obstetrics and gynecology have made constantly increasing demands on its pages with resulting but unavoidable delays in publication. New societies which devote themselves to this specialty have likewise increased in number and importance, and their transactions constitute very valuable additions to medical literature society. During recent years it has been found necessary to condense discussions more and more until finally we were forced to suspend completely their publication. The earlier volumes of the JOURNAL averaged about 800 pages while the last one includes almost 950. Even with this increase in the number of pages, original contributions had to be condensed and cut, and often bibliographies had to be omitted. High standards of acceptance have been adhered to and the contents of the JOURNAL have included in cross-section contributions from all sources so far as it was possible to publish them within our page limits.

In response to the universal demand for more space, the editors and publishers of the JOURNAL have decided to provide this by a substantial increase in the number of pages for each issue beginning with the January number, commemorating in this way the publication of the thirty-first volume. Each monthly issue will include an addition of 32 pages, or a total of about 200 pages per volume.

As announced in our initial prospectus "the AMERICAN JOURNAL OF OBSTETRICS AND GYNECOLOGY will be conducted by the profession for the profession and, in order that the latter may be fully represented in its management, the general conduct of the enterprise is vested in an Advisory Editorial Board, the membership of which serves as a guarantee that the interests of the profession will be adequately protected and assured." Various changes in the Advisory Editorial Board have been brought about by death and other reasons. Its members have been freely consulted in the acceptance or rejection of papers submitted for publication, and this practice will continue together with the more direct individual aid given by a special Publication Committee.

The editors and publishers again respectfully submit, as they did some fifteen years ago, the AMERICAN JOURNAL OF OBSTETRICS AND GYNECOLOGY to the attention and support of the profession, "fully realizing the trust imposed upon them and hoping for an endorsement of the attempt to serve their interests."

GEORGE W. KOSMAK
HUGO EHRENFEST

January 1, 1936.

Original Communications

CHRONIC HYPOCHROMIC ANEMIA IN WOMEN

A CONSIDERATION OF ITS ETIOLOGY AND TREATMENT, WITH SPECIAL
REFERENCE TO THE RELATIONSHIP OF GYNECOLOGIC DISORDERS

LAMAN A. GRAY, M.D., AND M. M. WINTROBE, M.D., BALTIMORE, MD.

(From the Departments of Gynecology and Medicine, Johns Hopkins
Hospital and University)

ATTENTION has been directed in recent years to a type of anemia which occurs almost exclusively in women, particularly between the ages of twenty and fifty years. The anemia is insidious in onset and of long duration. Symptoms of fatiguability, weakness, shortness of breath, palpitation, and gastrointestinal or nervous complaints are common, but in some instances the patients have become so adjusted to their state of poor health that, although they do not appear well, they deny any specific complaints. Some of these cases have been labelled "neurasthenic." On the other hand, such symptoms as glossitis, stomatitis, and paresthesias have led to the suspicion of pernicious anemia. In certain cases in which gynecologic symptoms have been prominent, surgical measures have been employed in treatment, but adequate attention has not been given to the other factors involved in the production of the anemia and relief of symptoms has consequently not been obtained. This anemia has been described under such titles as late chlorosis, simple achlorhydric anemia and idiopathic hypochromic anemia. Faber¹ was one of the first to direct attention to this syndrome twenty-five years ago, but it was not until the papers of Witts² appeared that physicians commenced to recognize the condition. In the past five years a great number of reports have appeared. The most recent reviews are by Wintrobe and Beebe³ and by Bethell et al.⁴

The patients usually appear tired and lifeless. There is marked pallor in long standing cases, and this may be waxy or slightly yellowish in character. The scleras are usually quite blue or pearly white. The skin is often wrinkled and inelastic. The finger nails are usually dull and lusterless, longitudinally ridged, and may be actually concave instead of convex. There may be slight papillary atrophy of the tongue. Functional systolic murmurs in the heart are common. The liver may be palpable, and the spleen has been felt in almost 50

NOTE: The Editor accepts no responsibility for the views and statements of authors as published in their "Original Communications."

per cent of the cases. Although there may be complaints referable to the nervous system, objective neurölogic findings are rarely if ever encountered.

The blood shows a marked reduction in hemoglobin which is quite out of proportion to the diminution in the number of red corpuscles. The latter, in fact, may be almost normal in number, even when the hemoglobin is greatly reduced. Considerable variation in the size of the red corpuscles is found in the blood smear, and some macrocytes may be observed, but the majority of the cells are small and poorly filled with hemoglobin. The mean volume of the corpuscles and their hemoglobin content³ are less than normal. Occasional normoblasts may be seen. No characteristic changes are found in the leucocytes or platelets. The anemia responds very readily to large doses of iron, but relapse is so common when iron is discontinued that it is considered to be characteristic.

The anemia is usually spoken of as being "idiopathic." Most writers have stressed the importance of achlorhydria in its etiology, while others have called attention to the importance of deficient diet. It has been noted that a number of these patients have undergone repeated pregnancies. Although it is generally recognized that menstrual disorders are common, they have usually not been considered as having an etiologic relation to the anemia.

Relatively few of the cases of idiopathic hypochromic anemia which have been reported have received adequate gynecologic study. Since the anemia encountered in these cases is indistinguishable from that due to chronic or repeated blood loss, both as regards morphologic characteristics and in its response to therapy, we felt that a careful consideration from the gynecologic standpoint, in addition to investigations of the gastric secretion and dietary habit, might afford important information in regard to the etiology of the anemia. The following observations are based on the study of forty cases which met the clinical and hematologic requirements³ for the diagnosis of idiopathic hypochromic anemia.

STUDY OF CASES

Myoma of the Uterus.—Myomas of the uterus were definitely palpable in eight (20 per cent) of the patients. All were associated with excessive uterine bleeding, which varied from menorrhagia confined to fairly regular periods of six to seven days, to menorrhagia at irregular periods which lasted two to three weeks. In four cases the diagnosis was confirmed at operation. None of the tumors were large; the supravaginal portion of the uterus removed at operation was only one and one-half to three times the size of the normal fundus. In addition to the eight patients with definite diagnoses of myomas of the uterus, there were two patients, included below under unexplained menorrhagia, in whom the excessive bleeding may well have been due to the same cause. The uterus in each of these individuals was diffusely enlarged, which suggests the presence of a myoma. Definite surface nodules were

In seven of the eight cases, there was a definite history of menorrhagia preceding or coinciding with the development of symptoms of anemia. The eighth patient (A. R.) noted menorrhagia only after she had been treated with iron for ten months, during which time the hemoglobin had increased from 4.3 gm. (30 per cent) to 10.5 gm. (72 per cent). This menorrhagia persisted and there were frequent relapses, in spite of the fact that large doses of iron were prescribed. It is interesting to note that in this case and another (R. W.) when the hemoglobin became quite low, the menses were greatly diminished, but when the hemoglobin rose with the administration of large doses of iron, blood loss became greatly increased over the normal.

Five patients responded well to iron therapy, two fairly well and one poorly. In one of the latter three patients (H. Z.), phlebitis was thought to be responsible for the inadequate response. In two others (C. S. and R. M.), complete relief of the anemia was hindered by persisting menorrhagia. Curettage in one of these patients (C. S.) was followed by relief of menorrhagia and complete restitution of the blood to normal. Menorrhagia was not relieved in the other (R. M.), and she responded poorly to various forms of iron therapy. Finally fairly satisfactory response followed the use of ferrous sulphate, in spite of continuing menorrhagia.

Relapses developed on discontinuation of iron in three cases (A. R., R. M. and R. W.). In all three of these patients, menorrhagia persisted. Hysterectomy was performed in four cases (H. Z., R. A., R. W. and C. S.) the blood having been first brought to normal or nearly normal with iron therapy. In these cases, after the iron was discontinued, the anemia did not recur in five, eight, nine and ten months respectively. In two patients (L. McC. and M. R.) the menopause occurred, iron was discontinued, and no relapse followed in ten and fourteen months, respectively.

Gastric achlorhydria after the histamine test was found in four of these cases, and, in three more, free hydrochloric acid failed to appear following the Ewald meal. In one patient the free hydrochloric acid following an alcohol test meal was fifteen.

Our patients were questioned in detail concerning their dietary habits. Special attention was paid to the intake of foods known for their hemoglobin producing effects, such as animal organs (liver, kidney, sweetbreads), animal skeletal muscle, fruits (especially apricots, peaches, and prunes), eggs, and green vegetables. Those who ate no animal protein or eggs, or at most took these foods rarely, were classified as taking a "very poor" diet. When these foods were eaten only once or twice a week, the patients were classified as taking a "moderately poor" diet. Any diet better than this was classified as "good."

Of the eight patients in whom myomas of the uterus were found, three took a diet very poor in iron-containing foods, two a moderately poor diet and three a good diet.

Endometrial Hyperplasia.—Cullen,⁵ followed by many others, has shown that hyperplasia of the endometrium is very commonly associated with menorrhagia and metrorrhagia. Five patients (12.5 per cent) in this series were found to have endometrial hyperplasia, as proved by examination of the curettings from the uterus in each case.

These patients stated that they had always been free bleeders, and had periods lasting seven to fourteen days. In each case there had been an increase in the menorrhagia just preceding the development of symptoms of anemia. One patient (A. T.) had always had menorrhagia, but with the development of marked weakness the menses for two years became scanty and of lighter color, and lasted only three to five days. The hemoglobin was 6.3 gm. (43 per cent) when she was first seen by us. As soon as the blood was brought to normal by iron, prolonged profuse menstrual periods reappeared and have continued for three years.

The blood of each of these individuals responded well to large doses of iron, except that of the patient who also had myomas of the uterus (H. Z.). In this

case the response was apparently delayed by phlebitis, as the blood later responded satisfactorily.

Relapse occurred in two cases (M. M. and F. P.) when iron was discontinued, but after menopause was produced by roentgen ray therapy, the blood was brought to normal by iron, and no relapse developed in four and eight months, respectively, after discontinuing iron. Curettage and then hysterectomy were performed in the case with submucous myomas and hyperplasia and the blood was brought to normal with iron. After the latter was discontinued there was no relapse in five months. One patient (A. T.) with continued menorrhagia has taken iron almost continuously for three years, and no relapse has developed. The fifth patient could not be followed.

Gastric achlorhydria after the histamine test was found in three cases. One patient showed free hydrochloric acid of 15 after an alcohol meal, and one free acid of 30 after the Ewald test meal.

Three patients took a very poor diet, one a moderately poor diet (H. K.) and one (M. M.) a good diet.

Unexplained Menorrhagia.—Fourteen patients (35 per cent) in this series have had excessive bleeding at the menstrual periods, and no cause has been found. (Small myomas have been suspected in two.) Six (15 per cent) of these have had moderate menorrhagia (profuse menses lasting seven to eight days) for several years or ever since puberty. In two of the latter, as the anemia progressed the menses diminished to a normal or even scant flow. Six (15 per cent) had marked menorrhagia (bleeding from eight to twenty-one days) preceding the onset of the anemia. In three of these the marked menorrhagia persisted throughout treatment of the anemia. One patient (S. M.) had always had moderate menorrhagia, but when the hemoglobin fell to 8.7 gm. (60 per cent), the menses became scant. Later when the blood was brought to normal, marked, instead of moderate menorrhagia appeared. The last (O. G.) of the fourteen patients with unexplained menorrhagia developed profuse prolonged periods after delivery, when the hemoglobin was 7.3 gm. (50 per cent). After several months the menorrhagia disappeared, to return a year later.

In only three of these patients has curettage been performed, the remainder having refused such an operation. Of the three, one showed chronic inflammation in premenstrual endometrium (both tubes had been removed, thus ruling out an incomplete abortion), and in two there was an early secretory type of endometrium. Very probably, if curettage could have been performed in the other cases, some would have shown hyperplasia or submucous myomas.

The blood of ten of these patients responded well to large doses of iron. That of one (O. G.) responded only fairly well but this was probably due to the fact that menorrhagia continued. Three patients have not been studied over a sufficient period of time.

When the iron was discontinued, there was relapse of the anemia in seven of the ten patients who have been followed. The menorrhagia had continued or returned in six, and the state of the menses was not known in the seventh case (L. W.). In three there was no relapse: one of these had passed the menopause; menstruation continued in one case but there was no longer any excessive flow; menorrhagia continued in the third patient, but large doses of iron were taken regularly and no relapse occurred.

Gastric achlorhydria was found in seven of this group (the histamine test was used in six). In one case (R. B.) free acid of two was found after an alcohol meal. In another patient (A. Y.) the free acid was ten after the Ewald meal. In three, normal acidity was found.

Ten of these patients were questioned about their diet. Two took a very poor diet, five a moderately poor one, and three a good diet.

Pregnancy.—The first appearance of symptoms of anemia in twelve (30 per cent) patients in this series was associated, according to the patient's own story, with pregnancy. Two of these patients (L. C. and E. Y.) were first seen by us during pregnancy, and in subsequent pregnancies relapse was observed. In the other ten cases the first actual blood examinations were made from three weeks to three years following pregnancy.

Six (15 per cent) of the above twelve cases, in addition to a history directly related to otherwise uncomplicated pregnancies, had had one or more abortions with hemorrhage, and two had had severe postpartum hemorrhages with subsequent pregnancies.

The blood of seven patients responded well to large doses of iron. One (M. P.) was pregnant, and her blood responded very slowly but it soon came to normal after delivery. The blood of another patient (O. G.) responded only fairly well, but she had marked menorrhagia. In the tenth patient (E. P.), sufficient time to study response has not yet elapsed. Two patients could not be followed.

The anemia relapsed in three patients during subsequent pregnancies. In two patients with marked menorrhagia there were relapses. In one (R. M.) there was no subsequent pregnancy and no menorrhagia; after the blood was brought to normal and the iron discontinued, there was no relapse in twelve months. One patient (L. W.) showed slight relapse during one year, but the state of the menses was not recorded. The remaining five patients have been observed an insufficient time to determine whether relapse will occur.

Two patients had seven pregnancies. In one they followed in rather rapid succession with increasing weakness and anemia. Three had six pregnancies, but the patients dated their symptoms of anemia from the last pregnancy. Two had four pregnancies; two, three; and three, two pregnancies.

Of these twelve patients, six had achlorhydria (five had histamine tests). One (H. A.) showed free acid of ten and another (L. C.) showed free acid of eighteen after histamine injection. Normal acid values were found in two cases.

Four patients in this group had taken very poor diets, four moderately poor, and two good diets.

No Gynecologic Condition.—In nine patients (22.5 per cent) in this series no abnormal blood loss at the menstrual periods was found, and the pelvic organs were normal. Although several of these patients had had one or more pregnancies, no definite relation of the history of the anemia to pregnancy or abortion could be found.

The ages of these patients varied from thirty-seven to sixty-six years, averaging forty-eight years. The menses had always been regular, except in one patient who had had slight irregularity. The periods in these cases lasted three to six days and never required more than two to three pads daily. Five patients had passed the menopause, sixteen, fourteen, twelve, seven, and three years previously. Six had had children, one as many as ten, but with one exception the last pregnancy varied from fourteen to forty years before the patients were seen. In one case there had been an abortion four years previously, but the blood was known to have been normal a year later.

The blood in each case responded well to large doses of iron. In five there was no relapse in from one to three years. In one (M. R.) after two years, during which she took no iron, there was a slight relapse. During this time she had not menstruated and had taken a good diet. The only factor to which we can attribute relapse of the anemia in this case is achlorhydria. One other patient (E. C.) developed menorrhagia for the first time in her life when the blood had been brought to normal. Rather marked relapse occurred in three months. This patient has achlorhydria and persists in her poor diet. The remaining two cases have been observed over too short a period to determine whether relapse will occur.

The diet was very poor in two cases, moderately poor in five, and good in two.

Achlorhydria was found in six (histamine test used in all). One showed free hydrochloric acid of ten after an alcohol meal, one free acid of twelve after an Ewald meal and one normal acidity. The two patients with good diets had achlorhydria after the histamine test.

DISCUSSION

Blood loss at the menstrual periods which we considered in excess of the normal was present at some time, and usually for a considerable period of time, in twenty-seven (67.5 per cent) of our cases. In eight patients this was associated with small myomas of the uterus, in five with proved endometrial hyperplasia, and in fourteen the cause was not discovered. This incidence of menstrual disorder is much higher than has heretofore been recorded. In a review of the literature³ one of us found menorrhagia mentioned in only twenty-eight of 189 cases (15 per cent), but this represents a series of cases in which this symptom was not mentioned as well as groups in which it was specifically recorded. An example of the latter is Haden's⁶ series of thirty-three patients, among whom eleven complained of menorrhagia.

Our cases were selected only in the sense that the diagnosis of idiopathic hypochromic anemia was made by internists and the patients came to our attention because of their anemia rather than on account of gynecologic symptoms. We believe, therefore, that the great discrepancy between our findings and those recorded in the literature is due to the fact that few of the cases heretofore recorded have been specifically studied from the standpoint of the menstrual function, nor have most of them received a thorough examination by a gynecologist. Women are rarely precise in regard to statements concerning menstruation and unless they are carefully questioned about the quantity of blood lost, an inaccurate history is often obtained.

It may also be pointed out that the anemia in these cases frequently does not correspond with the degree of recent blood loss. It is essentially an anemia of many years' duration and excessive hemorrhage may have occurred a number of months previously, thus giving the impression that it was entirely unassociated with the anemia. Again, as the anemia becomes more pronounced the menstrual flow may become quite scanty. This was the case in six of our patients who gave a definite history of menorrhagia preceding the period of hypomenorrhea. It is significant also, that in four patients in whom the menstrual flow was normal or diminished at the time they were first seen, menorrhagia appeared when the anemia was relieved by iron therapy. It has not been our usual experience that menorrhagia, when present, is relieved by iron therapy, as is often stated.^{6, 7} In sixteen cases menorrhagia continued in spite of relief of the anemia.

TABLE I. SUMMARY OF CASES

GYNECOLOGIC STATUS	NUMBER OF CASES	GASTRIC ANALYSIS		DIET		GOOD RESP. TO IRON	RELAPSE ASSOCIATED WITH		RELAPSE FOLLOWING CHECKING OR COUNTER-ACTION OF BLOOD LOSS
		ACHILOR-HYDRIA	HYPOCHILOR-HYDRIA	VERY POOR	MOD. POOR		BLOOD LOSS OR PREGNANCY	NO BLOOD LOSS OR PREGNANCY	
Myomas of the uterus	8	7	1	3	2	5	3	0	None in 6
Endometrial hyperplasia	5	3	1	3	1	4	2	0	None in 4
Unexplained menorrhagia	14	7	2	2	5	10	7	0	None in 6
Pregnancy, postpartum hemorrhage and abortion	12	6	2	4	4	7	5	0	None in 3
Total cases with significant gyn. findings	31	19	5	10	8	25	14	0	None in 16
No gyn. condition	9	6	2	2	5	9	1	1	
Total	40	25	7	12	13	34	15	1	

The influence of pregnancy may be the same as that of blood loss, for hemoglobin-building material is probably withdrawn by the fetus.⁸ When to our group of cases with menorrhagia are added those in whom a definite relation to pregnancy, postpartum hemorrhage, or abortion could be found, the total number of cases in whom some form of blood loss was present becomes thirty-one (77.5 per cent). When it is considered that idiopathic hypochromic anemia occurs most often between the ages of twenty and fifty years, that there is a marked decrease in its incidence after fifty years of age,³ and that it is very rare in men, it seems reasonable to conclude that menstruation, pregnancy, and the associated disorders of a hemorrhagic nature are significant in the development of these cases of anemia.

It cannot be concluded, however, that blood loss is itself the sole cause of the anemia. In the normal individual the degree of blood loss which occurs in most of these cases does not cause anemia of the duration or severity encountered in idiopathic hypochromic anemia. Our own data support the assumption that a chronic defect in alimentary function and defective diet are important factors in the etiology of the anemia.

Achlorhydria as determined by the histamine test was found in twenty-one of our cases, and in four more there was no secretion of free hydrochloric acid following the Ewald meal. In seven patients there was hypochlorhydria, making a total of thirty-two of the thirty-eight cases examined (84 per cent) in whom some disturbance in gastric secretion was found. Using the histamine test, Pollard⁹ found achlorhydria in 4.7 per cent, 7.5 per cent, 19.1 per cent, 18.0 per cent, and 21.9 per cent of normal women in the third, fourth, fifth, sixth, and seventh decades, respectively. The incidence of histamine achlorhydria was three to eight times as common in each decade of our series as in Pollard's "normal" group.

The relationship of faulty alimentary function to anemia is discussed fully elsewhere,¹⁰ and it must suffice here to mention the evidence which suggests that defective gastric secretion is important in the development of hypochromic microcytic anemia. (1) Whenever extensive gastric operations have been followed by the development of anemia, the anemia has, with few exceptions, been of the hypochromic microcytic type. (2) Complete gastrectomy in animals has also been followed by the development of this type of anemia, especially when pregnancy has been associated. (3) Mettier and Minot¹¹ found that iron is more potent for blood formation when absorbed from an acid than from an alkaline medium within the intestinal tract. (4) The experiments of Dameshek¹² and of Mettier, Kellogg and Rinehart¹³ indicate that a diet rich in organic iron is ineffective in causing a reticulocyte response in cases of idiopathic hypochromic anemia un-

less it has been predigested in hydrochloric acid and pepsin, or in normal gastric juice.

A number of writers have stated that the diets of many patients suffering from chronic hypochromic anemia are lacking in iron-rich foods. Recently, Davidson et al.¹⁴ studied this subject and pointed out that the excess iron intake in the normal diet is only slightly more than is actually needed, especially in women in whom the reproductive and menstrual functions provide a common drain on the hemoglobin stores. Of thirty-five of our patients, regarding whom such data could be obtained, twenty-five (71.4 per cent) took a diet deficient in iron-containing foods. Twelve of these patients lived essentially on carbohydrates, the "tea and toast" diet.

It is our impression, derived from the study of our own cases as well as those recorded in the literature, that in the so-called idiopathic hypochromic anemia, the anemia is the result, in a very large measure at least, of the influence of the three factors discussed; namely, faulty alimentary function, defective diet, and blood loss (including pregnancy and lactation). Achlorhydria alone is not sufficient to cause anemia, as the large number of persons with achlorhydria and no anemia indicates. Although it is conceivable that the diet may be so deficient over a long period of time as to lead to anemia, this actually rarely occurs. When achlorhydria, or a defective diet, or both are present, however, menorrhagia of even moderate degree, pregnancy, particularly several pregnancies in rapid succession, abortion or postpartum hemorrhage, or even normal menstruation may so tax the hemoglobin-building stores of the body that hypochromic microcytic anemia eventually develops. Such an hypothesis explains the sex and age incidence of idiopathic hypochromic anemia as well as its chronicity and lack of spontaneous remissions.

Relapse is common in idiopathic hypochromic anemia. Study of our cases suggests that this is generally due to continuation of the drain on the hemoglobin-building stores. Relapse developed in fourteen of the thirty-one cases with significant gynecologic findings, whereas it occurred in only two of the nine without gynecologic disorders, and even in one of the latter the relapse was associated with the development of menorrhagia for the first time in the patient's experience. In all of the fourteen cases above mentioned, blood loss or pregnancy was associated with the relapse. Relapse developed in one to fifteen months after iron was discontinued.

Of the fourteen patients in whom relapse occurred, spontaneous menopause subsequently developed in one, menopause was produced by radiation in two, and hysterectomy was performed in two. In none of these cases has relapse again developed (eight to thirteen months).

Only in one case has relapse not been associated with continuing

blood loss. This patient's diet is good, and the only abnormality we have discovered is failure to secrete more than a few cubic centimeters of gastric juice or any free hydrochloric acid even after histamine stimulation.

TREATMENT

Intelligent treatment of chronic hypochromic anemia in women necessitates an appreciation of the factors which may cause this type of anemia. Needless to say, it is important, especially in older patients, to rule out demonstrable causes of the anemia, such as malignancy with blood loss. When thorough examination reveals that one is dealing with the so-called "idiopathic" hypochromic anemia, it is of first importance to treat the anemia. The administration of large doses of iron in the form of ferrous sulphate (0.2 gm. t.i.d., p.e.), iron ammonium citrate, 2 gm. t.i.d., p.e.), or reduced iron (1-2 gm. t.i.d., p.e.) is followed in most instances by a rapid restitution of the blood to normal. Only when blood loss was severe, during pregnancy, or when there was some complicating infection, was the response not entirely satisfactory in our cases. It may be noted that relief of the anemia can occur in spite of continued faulty diet and achlorhydria. Persistence in a deficient diet will, however, favor relapse. Its correction will be found more simple as the patient's well-being is regained under iron therapy. The value of liver, kidney, sweetbreads and muscle meat, eggs, such fruits as apricots, peaches, prunes, raisins and apples, and vegetables such as spinach and beet greens, should be stressed.

Unless blood loss is severe, gynecologic therapy may be postponed until the anemia has been entirely relieved and an opportunity has been afforded to observe the gynecologic complaints under more normal conditions. If response is unsatisfactory as the result of continued blood loss, however, gynecologic treatment should be instituted as soon as the patient's general condition permits. The association of relapse with gynecologic disorder, even if there is no other indication, emphasizes the importance of gynecologic attention.

We have been particularly impressed with the great value of suction curettage without anesthesia.¹⁵ If bleeding is in progress, this method will prove a great economy of time in treatment of the anemia. If endometrial hyperplasia or other so-called functional bleeding is present, a single curettage may give relief for several months. This may be repeated as often as necessary until the menopause occurs. If menorrhagia is particularly troublesome, hysterectomy, or castration by radiation may be advisable. If the bleeding is due to myomas of the uterus, operation is the procedure of choice and may be carried out as soon as the patient is in the proper physical condition.

SUMMARY AND CONCLUSIONS

1. A series of 40 patients with hypochromic microcytic anemia of obscure origin (idiopathic hypochromic anemia) has been studied, particularly from the gynecologic standpoint.

2. Myomas of the uterus were found in 8, endometrial hyperplasia was present in 5, and unexplained menorrhagia was encountered in 14 cases. Twelve patients gave a history of repeated pregnancies, postpartum hemorrhage or abortion. There was evidence of excessive demands for hemoglobin formation in a total of 31 cases (77.5 per cent).

3. Achlorhydria was found in 25 cases and hypochlorhydria in 7 more, making a total of 32 instances (84 per cent of those examined) in which some evidence of faulty alimentary function was found.

4. The diet was poor in foods known for their hemoglobin-building properties in 25 patients (71.4 per cent of those regarding whom such information was obtained).

5. The etiology of this anemia is discussed, and it is concluded that it is usually the result of the operation of one or all of three factors; namely, faulty alimentary function, defective diet and excessive demands for hemoglobin.

Faulty alimentary function probably impairs absorption of hemoglobin-building materials in the diet; a diet which is low in such foods contributes to the relative deficiency. In most individuals these two factors alone are not great enough to lead to anemia, but moderately increased demands for hemoglobin, and even the requirements of normal menstruation in some women, precipitate the anemia.

6. The value of large doses of iron, correction of diet and gynecologic therapy is discussed.

7. Relapse is common in this type of anemia and is due in most instances to persistence of increased demands for hemoglobin. Relapse may very often be prevented by checking the excessive requirements.

REFERENCES

- (1) *Faber, K.*: Med. Klin. 5: 1310, 1909. (2) *Witts, L. J.*: Guy's Hosp. Rep. 80: 253, 1930. (3) *Wintrobe, M. M., and Beebe, R. T.*: Medicine 12: 187, 1933. (4) *Bethell, F. H., Goldhamer, S. M., Isaacs, R., and Sturgis, C. C.*: J. A. M. A. 103: 797, 1934. (5) *Cullen, T. S.*: Cancer of the Uterus, Philadelphia, 1900, W. B. Saunders Company, p. 479. (6) *Haden, R. L., and Singleton, J. M.*: AM. J. OBST. & GYNEC. 26: 330, 1933. (7) *Minot, G. R.*: Idiopathic Hypochromic Anemia, Emanuel Libman Anniversary Volumes, New York, 1932, International Press, p. 1. (8) *Strauss, M. B.*: J. A. M. A. 102: 281, 1934. (9) *Pollard, W. S., quoted in Bloomfield, A. L., and Pollard, W. S.*: Gastric Anacidity, New York, 1933, The Macmillan Co., p. 56. (10) *Wintrobe, M. M.*: Diseases of the Blood, in Tice, Practice of Medicine, VI, Hagerstown, Md., 1935, W. F. Prior Co. (11) *Mettier, S. R., and Minot, G. R.*: Am. J. M. Sc. 181: 25, 1931. (12) *Dameshek, W.*: J. A. M. A. 100: 540, 1933. (13) *Mettier, S. R., Kellogg, F., and Rinehart, J. F.*: Am. J. M. Sc. 186: 694, 1933. (14) *Davidson, L. S. F., Fullerton, H. W., Howie, J. W., Croll, J. M., Orr, J. B., and Godden, W.*: Brit. M. J. 1: 685, 1933. (15) *Norak, E.*: J. A. M. A. 104: 1497, 1935.

A STUDY OF OVARIES FOLLOWING PREOPERATIVE ADMINISTRATION OF AN EXTRACT OF PREGNANCY URINE*

E. C. HAMBLEN, M.D., AND R. A. ROSS, M.D., DURHAM, N. C.

(From the Department of Obstetrics and Gynecology, Duke University Hospital)

PREVIOUS reports by one of us (E. C. H.)¹ have been made of studies of ovarian tissue removed at operation from patients who had received preoperative injections of an extract of pregnancy urine which contained the so-called "anterior pituitary luteinizing" factor (APL/PU). One of these reports² detailed the findings in a group of patients with menometrorrhagia in which there was hyperplasia of the endometrium. It is our purpose at this time to present the study of ovaries from a total of 24 patients, who have been placed in three groups: Group I, 9 patients with regular menstrual cycles; Group II, 11 patients with menometrorrhagia ascribed to hyperplasia of the endometrium; and Group III, a miscellaneous group of 4 patients, 1 with delayed puberty and hypogonadism, 1 with inflammatory menometrorrhagia, and 2 with secondary amenorrhea.

CONDITIONS OF THE STUDIES

The ovarian specimens subjected to study have been collected during the last four years. The various members of our staff have aided us in the collection of this material at the operating table. Specimens were subjected to as little trauma as possible in their removal and were fixed promptly in Helly's modification of Zenker's solution. We have excluded from study material from patients with gross or clinical inflammatory processes or benign or malignant tumors of the generative tract.

A gross study of both ovaries was made at the time of laparotomy, and these data were recorded: size of ovaries; presence of and relative number of small cysts; presence of or absence of recent or old corpora lutea; presence of hemorrhage; and any other significant findings. The amount of ovarian tissue available for microscopic study from these twenty-four patients was as follows:

Portion of one ovary	4 cases
Portion of both ovaries	2 cases
One entire ovary	13 cases
Both ovaries	4 cases
Portion of an ovary and an entire ovary	1 case

*Submitted for publication, June 3, 1935.

The expense of these studies was in part defrayed by a grant from the Research Council of Duke University.

When only portions of ovaries were removed, an effort was made to include, if possible, in the removed portion the significant gross findings.

Following fixation and embedding of the ovarian specimens, serial sections cut at 5 micra were made and stained with hematoxylin and eosin. Thus, all the ovarian tissue removed was available for microscopic study. Significant areas were photographed: a total of nearly 300 microphotographs was taken for aid in reviewing cases and in the tabulation of findings. A large number of these photographs, along with case protocols, charts, etc., formed an exhibit at the Cleveland Session of the American Medical Association in 1934.

Only one commercial preparation of APL/PU was used (antuitrin-S). In most instances, this was reassayed in our own laboratories for potency and where there was disagreement between the stated potency and our assay results, our potency values were used in reporting the dosage. The route of administration was uniformly subcutaneous. The dose at a single injection varied between 100 and 400 R.U. The frequency of dosage varied from one to four times daily. The total dosage ranged from 800 to 8,200 R.U. The duration of injections was from three to thirteen days. The time which elapsed from the last injection until the time of laparotomy varied from one to fourteen days. Injections were given on the second to the thirty-second day of the menstrual cycle. The time that laparotomy was performed varied from the eleventh to the fortieth day of the cycle.

In the selection of material for study the ages of the patients were considered. No senile ovaries were studied. An attempt was made to secure material from the younger patients and the older patients which might allow grouping as to immaturity and maturity. In Group I, the ages varied from twenty-one to forty-four years; in Group II, the ages varied from sixteen to forty-three years; and in Group III, the age variation was from thirteen to thirty-eight years.

GROSS APPEARANCE OF OVARIES

Summary of the gross appearances of the ovaries at laparotomy is omitted, since there were no significant findings which are not included in the tabulation of microscopic findings.

MICROSCOPIC FINDINGS IN OVARIES OF PATIENTS IN THE THREE GROUPS

A. Primordial and Early Follicles.—These were not affected apparently in number or character and corresponded well to the ages of the patients. In Case 14, in which only a very few primordial follicles were seen, only one early follicle was observed in spite of a total administration of 2,400 R.U. of APL/PU with single doses of 200 R.U. twice daily. In Case 7, where a rudimentary and preadolescent ovary was studied, approximately six to seven primordial follicles were seen, but no developing or maturing ones in spite of the total administration of 1,600 R.U. of APL/PU given in single doses of 200 R.U. one to two times daily.

B. Maturing Follicles.—1. *Number:* The findings of the microscopic study of maturing follicles are given in Table IV. These occurred, as would be expected, more abundantly in the younger patients.

2. *Degenerative Changes:* A study of the degenerative changes tabulated are given in Table IV. These included cytolysis, theca interna proliferation, and granulosa luteinization. All maturing follicles studied showed some degree of degeneration, usually cytolysis of the granulosa. Proliferation of the theca interna associated with increased vascularization was observed commonly (see Fig. 1). Seventeen cases showed this and in three cases it was quite marked. In two cases there was apparent lutein change in the granulosa. This theca lutein proliferation was marked particularly in the patients in Group II. The only three cases in this group, in which this was not observed, showed no maturing follicles in two instances and only one in another.

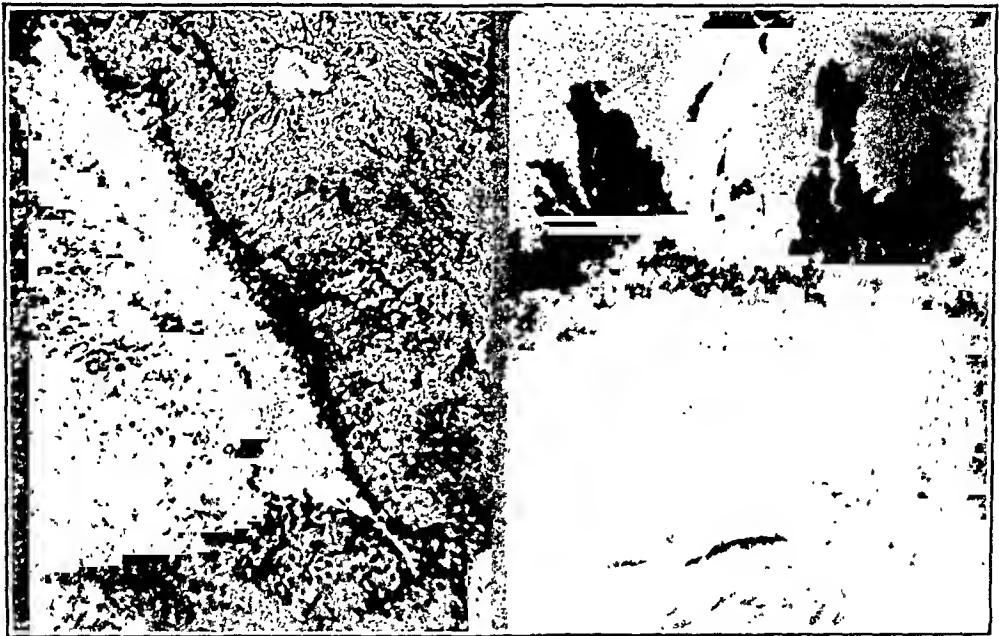


Fig. 1.

Fig. 2.

Fig. 1.—Case XIII. Degenerating follicle with cytolysis of granulosa and proliferation of theca lutein cells. ($\times 120$)

Fig. 2.—Case XV. Wall of follicular cyst showing similar changes. ($\times 120$)

3. *Hemorrhage:* Hemorrhage did not form a striking finding in our studies. In five cases in Groups I and II an occasional follicle showed perfollicular hemorrhage. This occurred in association with increased proliferation of the theca interna and of the thecal vessels. Hemorrhage into the follicles was uncommon and occurred in a single instance in two cases in Group I, in one case in Group III, and in two cases in Group II (see Fig. 3). In all instances except two this hemorrhage was associated with the presence of recent corpora lutea.

C. Follicular Cysts.—1. *Number:* The relative number of follicular cysts observed in the three groups of patients is shown in Tables I, II, and III, and Table V gives the details of the microscopic findings in these cysts. These cysts occurred more abundantly, as would be expected, in the younger patients with hyperplasia of the endometrium.

2. *Degenerative Changes:* These include cytolysis, proliferation of the theca interna, especially of the theca lutein cells, and granulosa luteinization. Cytolysis

in the granulosa was observed in varying degrees in all patients in whom follicular cysts were observed. In ten of the twenty-four patients apparent granulosa luteinization was observed. Degenerative changes were observed primarily in the cells furthest removed from the basal layer, whereas in eight cases the cells of the basal layer and near the basal layer showed evidence of proliferation, with frequent mitotic figures. In sixteen of the twenty-four cases proliferation of the theca interna and especially of the theca lutein cells about the cysts was observed (see Fig. 2). All of these cases fell in the younger age group, the oldest patient being thirty-one years of age.

3. *Hemorrhage*: This did not form a striking finding. Perifollicular hemorrhage in small amounts was observed in four cases and was associated with proliferation of the theca lutein cells and with increased vascularization. Intrafollicular hemorrhage was observed in varying small amounts in seven cases. In only two instances were recent corpora lutea associated.

4. *Ova*: These in fair state of preservation were observed within the follicular cysts in fourteen of the twenty-four cases. In patients in Group I (those with



Fig. 3.—Case XXIV. Follicle showing perifollicular and intrafollicular hemorrhage. Note the ovum "imprisoned" by lutein cells. ($\times 180$)

regular menses) only one patient failed to show ova in these cysts. This patient was thirty-seven years of age and the portion of ovary examined showed only a few cysts. In Group II only four of the younger patients showed ova in the follicular cysts. The two patients in Group III, in whom ova were not found in the cysts, were a girl of thirteen who had never menstruated and a woman of thirty-eight who had not menstruated in seven months.

D. *Corpora Lutea and Corpora Albicantia*.—Table VI shows the findings in corpora lutea and corpora albicantia. In Group I (patient with regular menstrual periods) recent corpora lutea were found in close agreement with the menstrual cycle. They were not observed in two cases. One of these patients was in the sixteenth day of her cycle and the other in the thirty-third day. In Group II (patients with hyperplasia of the endometrium) no recent corpora lutea occurred in the younger age group (ages 16, 20, 23, 26, 31, 34); they were found in the older age group (ages 32, 32, 40, 42, 43). Recent corpora lutea were not observed in any patients of Group III. In general, it was thought that the age of the hemorrhage and of the lutein cells corresponded well. In eight instances corpora albicantia with recent hemorrhage and, in several instances, with persisting lutein cells were ob-

TABLE I. PATIENTS HAVING REGULAR MENSTRUAL CYCLES

CASE	AGE	CONDITION OF API/P.U. ADMINISTRATION				LAPAROT- OMY (DAY OF CYCLE)	MICROSCOPIO FINDINGS								
		SINGLE DOSES R.U.	AVERAGE FRE- QUENCY	DAYS OF CYCLE	TOTAL DOSAGE R.U.		RECENT CORPUS LUTEUM	RELATIVE NUMBER PRE- MORDIAL FOLLICLES	MATURING FOLLICLES			FOLLICLE CYSTS			
									RELA- TIVE NUMBER	DEGEN- ERATION	HEMOR- RHAGE	RELA- TIVE NUMBER	CHANGES IN WALLS	OVA	HEMOR- RHAGE
24	21	200	2X	7-10	1600	+	++	++	++	0	++	++	++	5	3
9	23	200	1X	11-14	1200	0	++	++	+	0	++	++	++	5	1
2	27	100	3X	26-32	2100	0	++	++	+	33 ^a	++	+	+	1	0
22	27	300	2X	16-20	3000	+ ^a	++	++	++	21	++	++	++	3	0
1	28	100	3X	7-15	2700	+	++	++	0	19	++	++	+	1	0
23	32	200	2X	16-17 6-8 ^b	800	+	++	++	++	17	++	++	++	3	0
8	36	200	1X	22-28	4000	+ ^c	+	++	++	14	++	++	++	2	1
21	37	100	2X	2-14	2600	+	+	0	0	15	+	0	++	0	1
5 ^a	44	200	3X	26-31	3000	+	+	++	++	40	+	++	++	3	0

^aMenses apparently delayed; menstrual history doubted.^bGiven during two previous menstrual cycles.^cTwo other persisting corpora seen with unabsorbed hemorrhage.^dCorpus corresponds to cycle; most hemorrhage absorbed (rupture probably occurred before extract began).

served. One case in particular warrants description (Case 8). This patient received APL/PU injections on the sixth to the eighth and the twenty-second to the twenty-eighth day of the two previous menstrual cycles and was operated upon on the four-

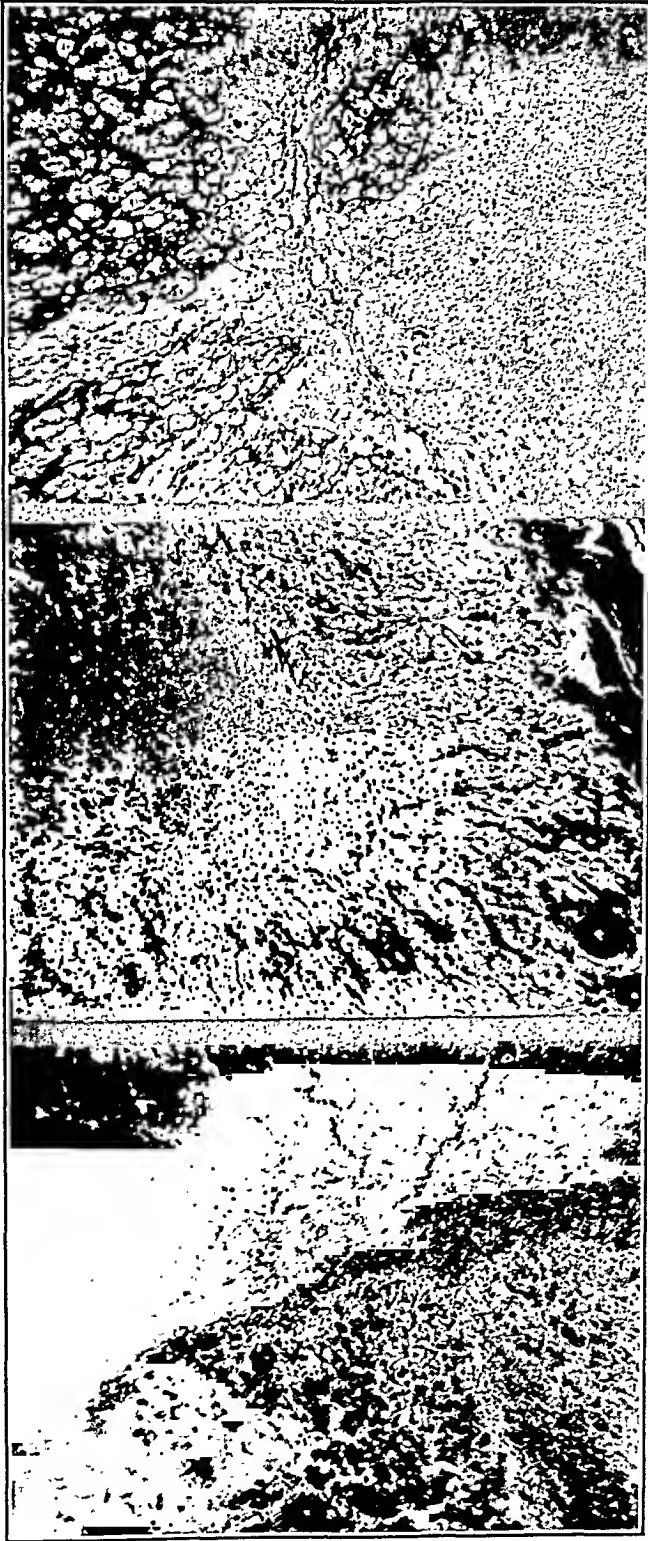


Fig. 4.

Fig. 4.—Case VIII. Recent corpus luteum from the left ovary. ($\times 160$)

Fig. 5.—Case VIII. Corpus luteum with well-preserved lutein cells and recent hemorrhage; this occurred also in the left ovary but was not apparently the same corpus luteum seen in Fig. 4. ($\times 120$)

Fig. 6.—Case VIII. An older corpus luteum from the right ovary. The red cells are well preserved. ($\times 160$)

teenth day of her third cycle. In addition to the presence of a very recent corpus luteum, two other corpora lutea with persisting lutein cells and fairly recent hemorrhage were observed (see Figs. 4, 5, 6).

DISCUSSION

The effects of the injections of urine of pregnant women have been described in detail by many observers in laboratory animals; the monkey is the only one of these which resembles the human female in having a

TABLE II. PATIENTS HAVING HYPERPLASIA OF THE ENDOMETRIUM

CASE	AGE OF PATIENT	DETAILS OF APL/P.U. ADMINISTRATION				TIME ELAPSED SINCE DIAGNOSIS BY D & C AND LAPAROTOMY/DAYS	RELATIVE NUMBER OF PRIMORDIAL FOLLICLES SEEN	RELATIVE NUMBER OF FOLLICULAR CYSTS SEEN	RECENT CORPORA LUTEA WITH FRESH HEMORRHAGE
		AVERAGE SINGLE DOSE/R.U.	AVERAGE FREQUENCY	NUMBER OF DAYS GIVEN	TOTAL DOSAGE/R.U.				
10	16	200	1x-4x	6	3200	Same	+++	+++	0
11	20	200-300	2x-4x	9	8200	9	+++	++++	0
13	23	200-300	2x-4x	7	7400	7	++++	++++	0
14†	26	200	2x	6	2400	8	+	1	0
12	31	200	4x	4	3200	7	++	+++	0
16	32	300	2x-3x	4	3000	120	++	+	+
19	32	200-300	3x-4x	7	6600	10	++	+	+
3*	34	100	3x	8	2400	4	+	+++	0
20	40	200	1x-4x	8	3000	13	0	2	+
17	42	200-400	1x-2x-3x	5	4400	7	+	+	+
18	43	200-400	1x-2x-3x	6	5400	11	+	++	+

*Menses essentially normal, although dilatation and curettage eight days before laparotomy showed polypoid hyperplasia; menorrhagia developed five months after laparotomy.

†Had had one-third skin erythema dose of deep x-ray to ovaries.

true menstrual cycle. Engle³ notes that "the response of the genital system to anterior lobe principles is the same in no two species of animals which have been investigated." Friedman⁴ has emphasized for the rabbit, and similar deductions have been in other species, that the dosage, route of administration of the given extract, and the condition of the ovary all modify the response obtained. Engle³ further states that "since it appears that the best follicle-stimulating extract tested to date will produce lutein tissue in the rodent with combined injections, the physiologic state of the receptor organ rather than the nature of the active principle accounts for the dual response" (follicle-stimulation and luteinization).

The striking difference in the origin of the corpus luteum in the human being as contrasted with the various laboratory animals and with animals as the sow from which experimental supplies of extracts have been prepared was clearly defined by Robert Meyer⁵ and his concept that the human lutein cell is derived from the granulosa is accepted generally at present. The thecal origin is accepted for the experimental animals.

With these differences in response so apparent in the various laboratory animals a study of human ovarian tissue following APL/PU ad-

TABLE III. PATIENTS WITH OTHER IRREGULARITIES OF MENSES

CASE	AGE	DIAGNOSIS	SINGLE DOSES R.U.	DAILY DOSE	NUMBER OF DAYS	TOTAL DOSAGE R.U.	LAPAROTOMY (DAY SINCE INITIAL DOSE)	RECENT CORPUS LUTEUM	RELATIVE NUMBER PREOVULATORY FOLLICLES	MATURING FOLLICLES			FOLLICULAR CYSTS			
										RELATIVE NUMBER	DEGENERATION	HEMORRHAGE	RELATIVE NUMBER	CHANGES IN WALL	OVA	HEMORRHAGE
7	13	Delayed menarche; hypogonadism; hypertrophy of clitoris	200	1x 2x	4	1600	5	0	+	0	0	0	0	0	0	0
15	18	Metrorrhagia; chronic endometritis; chronic salpingitis	200	1x	3	1000	"									
			100-	1x	10	4700	11 ^b	0	+++	++	++	0	+++	+++	2	7
			200	2x												
				3x												
4	21	Amenorrhea; fourth month puerperium	100	3x	8	2400	9	0	++	++	++	1	+++	+++	3	0
6	38	Amenorrhea; premenopause	200	3x	5	3000	6	0	+	+	+	0	+	++	0	3

^aAdmission of January, 1933, with bleeding for 19 days; dilatation and curettage after three days of APL/P.U. which had failed to check bleeding.

^bAdmission October, 1933, with bleeding for 40 days; dilatation and curettage on admission followed by APL/P.U. and laparotomy. Numerals refer to number seen.

TABLE IV. STUDY OF MATURING FOLLICLES

CASE	24	9	2	22	1	23	8	21	5	10	11	13	14	12	16	19	3	20	17	18	7	15	4	6
AGE	21	23	27	27	28	32	36	37	44	16	20	23	26	31	32	32	34	40	42	43	13	18	21	38
Cytolytic degener- ation	+	++	++	++	0 ¹	+++	+++	0 ^a	+++	++	++	+++	+	++	0 ^a	+	++	0 ^a	+	++	0 ^a	++	++	+
Theca interna pro- liferation	+++	+	+	0	0	+	++	0	++	+	++	+	0	++	0	+	+	0	+	+	0	++	++	+
Granulosa luteiniz- ation	++	0	0	0	0	0	0	0	0	+	0	0	0	0	0	0	+	0	0	0	0	0	0	0
Perifollicular hemorrhage	++	0	(1)	0	0	0	+	0	+	0	0	0	0	0	0	0	0	0	0	0	0	+	0	0
Intrafollicular hemorrhage	+	0	(1)	0	0	0	+	0	0	0	0	0	0	0	0	0	0	0	+	+	0	+	+	0
Individual dosage/R.U.	200	200	100	300	100	200	200	100	200	200	200	200	200	200	300	200	100	200	200	200	200	100	200	200
Total dos- age/R.U.	1600	1200	2100	3000	2700	800	4000	2600	3000	3200	8200	7400	2400	3200	3000	6600	2400	3000	4400	5400	1600	4700	2400	3000
Case Classification	Table I Patients With Regular Menses										Table II Patients With Hyperplasia of Endometrium										Table III Miscellaneous			

*No maturing or mature follicles seen; (1), (2) etc., Numerals refer to number seen.

TABLE V. STUDY OF FOLLICLE CYSTS

CASE	24	9	2	22	1	23	8	21	5	10	11	13	14	12	16	19	3	20	17	18	7	15	4	6
AGE	21	23	27	27	28	32	36	37	44	16	20	23	26	31	32	32	34	40	42	43	13	18	21	38
Cytolytic degeneration	+	+++	++	+++	+	+++	++	+	+	+	+++	++	0*	+	(1)	++	+	(2)	++	+	0*	+++	++	++
Theca interna proliferation	++++	0	+	0	+	+	+	+	++	+++	++	++++	0	+++	0	+	0	0	0	++	0	+++	+	+
Granulosa luteinization	++	+	0	+	0	0	0	+	0	+	0	++	0	+++	0	0	0	0	+	++	0	0	0	+++
Perifollicular hemorrhage	++	0	0	0	0	0	0	0	0	0	0	0	0	+	0	+	0	0	0	0	0	+	0	0
Intrafollicular hemorrhage	++	+	0	0	0	0	+	0	0	+	0	+++	0	0	0	0	0	0	0	0	0	+++	0	+++ (4)
Mitotic figures seen in granulosa	++	0	0	0	0	+	0	0	+++	0	0	+	0	+	0	0	0	0	0	0	0	+	++	+
Ova in cysts	+	+++	+	++	+	++	++	0	+++	0	+++	+++	0	+	0	++	0	0	0	0	0	+	++	+
Dosage APL Extract	(2)	(5)	(1)	(3)	(1)	(2)	(2)	0	(4)	0	(4)	(4)	0	(1)	0	(2)	0	0	0	0	0	+	++	0
	200	200	100	300	100	200	200	100	200	200	200	200	200	200	300	200	100	200	200	200	200	100	200	200
Total dosage/R.U.	1600	1200	2100	3000	2700	800	4000	2600	3000	3200	8200	7400	2400	3200	3000	6600	2400	3000	4400	5400	1600	4700	2400	3000
Case Classification	Table I Patients With Regular Menses										Table II Patients With Hyperplasia of Endometrium										Table III Miscellaneous			

*No follicle cysts seen; (1), (2) etc., Numerals refer to number seen.

ministration seemed justified. The rather general use clinically of certain commercial preparations of APL/PU and the equivocal results reported by many seemed to urge a careful consideration of the possible method of action, if any, of such preparations. With the various hemorrhagic and lutein changes seen in the ovaries of rodents in mind, one was led to question the possibility of serious damage from such administrations to the human ovary, particularly in the immature patients.

We are in thorough agreement with Pratt⁶ when he notes: "A true evaluation of the normal ovary is difficult to attain, for the literature concerning the normal ovary is inadequate for obvious reasons. The best material is obtained at operation, and naturally most operations are performed on account of preexisting pathologic states. My observation is that a normal ovary does not frequently show evidence of hemorrhage, but that even the gentlest manipulations exerted to bring the organ into clear view readily produce slight hemorrhages, a fact which is easily explained when the delicacy of the newly forming capillaries is considered. The traumatization during removal accounts for many of the recent hemorrhages seen in laboratory specimens." Our interpretation of our findings must be made in the light of our meager concepts of the normal human ovary, gained chiefly from its appearance at operation and from the microscopic study of specimens of ovary which are available from surgical pathologic and autopsy specimens.

The assumption seems warranted that primordial follicles and early developing follicles are not affected by these injections. This is illustrated apparently by Cases 7 and 14, in which there were observed primordial follicles but no maturing ones. Were the action of the APL/PU on these, one should expect to find some evidence of development or maturation.

Pratt⁷ citing recent work on ovogenesis in the adult, especially that of Evans and Swezy⁸ and the unpublished work of Edgar Allen (confirming ovogenesis in the human being) calls attention to "the careful consideration of the possible influences on continued new formation of ova in the adult ovary" that may be exerted by these extracts. It is difficult to get sections showing good germinal epithelium, but with modifications of technique, our sections may allow a review with consideration of these problems.

The degenerative changes observed in these maturing follicles have formed an interesting part of our studies. These changes are in all essentials those expected in the life cycle of the graafian follicle, for as Engle³ notes: "Save for the granulosa cells which undergo lysis in atretic follicles, there is no other fate for granulosa cells than that of transformation into lutein tissue." The most striking of the degenerative changes observed is an apparent increased activity of the theca interna, and especially of the theca lutein cells with increased peri-

follicular vascularization. This is quite marked about the majority of the maturing follicles and follicular cysts. When one studies these follicles and cysts, one appreciates the similarity of these to the changes seen in the ovaries of rodents. The theca lutein cells have proliferated as in the rodent but without formation of true lutein cells in the human being but rather of para-lutein cells. Such stimulation in the rodent produces true lutein cells. Hemorrhage into these follicles and cysts does not occur in our sections except in a few instances. Where it does occur, it may well be explained at least in part by surgical trauma and thecal vascularization.

It is interesting to speculate whether these proliferating theca lutein cells secrete progesterin. Since the presence of progesterin has been demonstrated in small amounts in association with corpora lutea in the human being,^{9, 6} an assay for progesterin content of ovaries which show no corpora lutea after APL/PU administration would be of value in solving this problem.

We were impressed also by the changes in the granulosa of the follicular cysts and by the relatively large number of contained ova in fair state of preservation. The observed mitotic figures in the granulosa cells and the number of these cells seemed to indicate either stimulation of developing follicles resulting in the recent formation of those cysts or the reactivation of the lining cells of cysts already formed. The former assumption seems more likely to us, as it explains also the good preservation of the ova.

There were five instances in which we may be forced to assume ovulation followed the administration of APL/PU if we agree with the generally accepted view as to the etiology of hyperplasia of the endometrium as emphasized by Bureh and his coworkers.¹⁰ These occurred in patients with hyperplasia of the endometrium whose ages were 32, 32, 40, 42, 43 years and in whose ovaries recent corpora lutea were found. It would seem reasonable to assume also that premenstrual endometrium and normal menses might have resulted. This is in accord with the clinical observation of some of those who have used APL/PU in the treatment of this condition; that it is much more effective in controlling the excessive menses in the older age group of patients than in the younger patients. It would seem evident that any beneficial result obtained in the younger patients could not be inferred as coming from the production of a true corpus luteum, induction of ovulation or correction of the basic ovarian or endometrial pathology. The fact that corpora lutea were found in general as expected from the menstrual cycle in women with regular menses, were not found in women with amenorrhea or in the younger patients with endometrial hyperplasia seems to indicate that ovulation, as a rule, is not induced by these injections.

One may question if the cause of excessive bleeding, attributed to hyperplasia of the endometrium, is the same in the younger and in the older patients. If one is sure of the sameness of the etiology, the explanation of the consistent difference in response must be made on the basis of the inherent difference in the ability of the younger and the older ovaries to respond to the same stimulus.

The study of corpora albicantia, some of which show recent hemorrhage with persisting lutein cells, and of the corpora lutea in Case 8, in particular, leads us to speculate that this extract may tend to promote persistence of lutein cells in preformed corpora lutea. Such a function would be compatible with the abundance of the APL factor in pregnancy and might point to its physiologic purpose of preserving the corpus luteum of pregnancy.

In general the changes which may be attributed to administration of the extract are primarily degenerative. One would not expect changes in these ovaries qualitatively much different from those observed as a result of the ordinary degenerative changes which are a part of ovarian physiology or would one expect these quantitatively much different from those seen in the ovaries in pregnancy which are subjected to the same principle in probably much higher concentration. The primordial and very early follicles show no definite changes. Stimulation to maturation of developing follicles may occur with proliferation of the theca interna, especially of the theca lutein cells, with increased vascularization. The follicles may develop rapidly, perhaps, into follicular cysts, with still active granulosa and surrounded by proliferated theca interna, in which theca lutein cells are very prominent (para-lutein cysts). Ovulation would not be favored in such cases. Preformed lutein cells are aided probably by increased vascularity to persist. Such changes could be of a temporary nature and rapid regression follow cessation of the extract administration. New developing follicles could result from the primordial follicles which are not damaged apparently. One fails to see in this type of action any changes which are desired in the normal menstrual cycle, but one can well understand their possible rôle in the pregnant woman.

These findings differ from those of Mandelstamm and Tschaikowsky¹¹ and of Geist.¹² Their findings were summarized in a previous report by one of us.²

Mandelstamm and Tschaikowsky reported on the effects of daily subcutaneous injections of prolan varying from 100 to 200 M.U. with total doses from 400 to 1,100 M.U. The ten women studied had normal menstrual cycles and were operated upon on account of fibromyomas, carcinomas of the cervix, or unilateral ovarian cysts. Six of the patients were between thirty and forty years of age, two between forty and forty-five years, and two between twenty and thirty years. The interval be-

tween the last injection and operation as well as the time in the menstrual cycle varied. They noted degenerative changes in the maturing and mature follicles which included defective ova and disintegrative and degenerative changes in the granulosa. There were cystic follicles, numerous corpora lutea and hemorrhages into the follicular apparatus. They felt that these changes were sufficient to produce a temporary sterility.

Geist has reported a study of the effect of injections of antuitrin-S on the mature human ovary from patients ranging in age from thirty-three to forty-eight years; the majority of those patients was operated upon because of uncomplicated fibroids. The total subcutaneous dosage varied from 600 to 2,200 R.U.; total daily dosage was in some instances 600 R.U.; period of administration was from thirty-six to one hundred hours. He noted occasional gross hemorrhages in the ovaries suggestive of a positive pregnancy test in the rodent. He was impressed also with the absence of what might be called follicle stimulation; the number of cystic follicles was increased apparently; theca lutein cells were thought to be increased. He thought that the intensity of the responses seen in the ovaries was directly proportional to the amount of injected hormone.

SUMMARY

1. A study of ovarian tissue from twenty-four patients following pre-operative administration of APL/PU is detailed.

2. Primordial follicles are not affected apparently by such administrations.

3. Degenerative changes apparently resulting from follicle stimulation are described.

4. The end-result of these changes appears in many instances to be follicular cysts, with active granulosa and fairly well preserved ova, and surrounded by a proliferated theca interna with prominent theca lutein cells (theca-lutein cysts) and with increased thecal vascularization.

5. Some evidence is adduced that persistency of preformed corpora lutea may result from such administrations.

6. Attention is called to the apparent difference in response in the ovaries of the younger and older patients with hyperplasia of the endometrium.

7. In general, it is believed that ovulation is not induced by such administrations.

8. The possible action of these extracts in many respects is more typical of the gestational cycle than the menstrual cycle.

9. One should probably expect no material qualitative or quantitative difference in the changes in these ovaries from those of ovaries in pregnancy.

10. One is led to question seriously the clinical value of such action on the ovaries of the nonpregnant woman.

11. Such changes as described are probably temporary in nature and it may be that no permanent damage results.

We have been furnished generous supplies of antuitrin-S for these studies by Dr. E. A. Sharp, of Parke, Davis and Company, to whom we are grateful. We wish to express to Dr. J. P. Pratt our appreciation for his many helpful suggestions in carrying out these studies. The close cooperation of the members of our department and of the Department of Pathology has been of paramount importance in the collection of this material for study. Dr. Wiley D. Forbus, head of the Department of Pathology, has aided us materially by supplying assistants for much of the technical work. The faithful and careful work of our research technician, Miss Margaret Baptist, has been invaluable.

REFERENCES

- (1) *Hamblen, E. C.*: South. Med. & Surg. 34: 339, 1932; Pan-American Med. Assn., Dallas, Texas, March 21-25, 1933; Reference by J. P. Pratt, Sex and Internal Secretions, Baltimore, 1932, Williams & Wilkins, pp. 900, 901; Virginia M. Month. 60: 286, 1933. (2) *Hamblen, E. C.*: Endocrinology 19: 169, 1935. (3) *Engle, E. T.*: Sex and Internal Secretions, Baltimore, 1932, Williams & Wilkins Co., pp. 794, 796, 797. (4) *Friedman, M. H.*: Am. J. Physiol. 90: 617, 1929. (5) *Meyer, R.*: Arch. f. Gynäk. 93: 354, 1911. (6) *Pratt, J. P.*: Arch. Path. 19: 545, 1935. (7) *Pratt, J. P.*: Pan-American Medical Association Meeting, Dallas, Texas, March 21-25, 1933. (8) *Evans, H. M., and Swezy, O.*: Mem. Univ. Calif. 9: 119, 1931. (9) *Pratt, J. P.*: Endocrinology 18: 667, 1934, cites the unpublished work of a co-operative group comprised of himself, Oliver Kamm, D. A. McGinty, J. C. Burch, and E. C. Hamblen. (10) *Burch, J. C., Williams, W. L., and Cunningham, R. S.*: Surg. Gynec. Obst. 53: 338, 1931. (11) *Mandelstamm, A., and Tschalkowsky, W. K.*: Arch. f. Gynäk. 151: 686, 1932. (12) *Geist, S. H.*: AM. J. OBST. & GYNEC. 26: 588, 1933.

Rosenheim, M. L.: Mandelic Acid in the Treatment of Urinary Infections, Lancet 1: 1032, 1935.

Because ketogenic diet requires rigid supervision of patient and diet, and is not pleasant, or suitable in the home, an attempt was made to find a keto- or hydroxy-acid which would be nontoxic and excreted unchanged in the urine.

B. coli has been the test organism against the following acids: B-hydroxybutyric, B-hydroxypropionic, laevulinic, lactic, pyruvic, benzoic, hippuric, benzoylactic, B-phenyl-B-hydroxypropionic, and mandelic. B-hydroxypropionic, laevulinic, benzoylactic, and mandelic offered promise. The first three were eliminated since they were either oxidized in the body or did not produce clinical results. Mandelic acid was nontoxic, was excreted unchanged, and had bacteriostatic action.

An ounce mixture containing 3 gm. of mandelic acid, 1.6 gm. sodium bicarbonate flavored with lemon was given four times daily while eight capsules containing 1 gm. of ammonium chloride were taken daily.

Twelve patients (6 pregnant) have received this treatment. Subjectively and objectively the patients improved rapidly. It is necessary to control the urinary pH by estimation with methyl red. Buzzing in the ears and temporary deafness occurred in two or three patients.

Mandelic acid appears to be effective in cases of urinary infection unassociated with urinary obstruction.

H. CLOSE HESSELTINE.

THE INFLUENCE OF COLLAPSE THERAPY IN THE TREATMENT OF PULMONARY TUBERCULOSIS ON MENSTRUAL PHYSIOLOGY

EDWIN M. JAMESON, M.D., SARANAC LAKE, N. Y.

THE increased use of procedures designed to collapse the affected lung in pulmonary tuberculosis makes a knowledge of the influence such operations have upon the pathologicophysiology of other systems of the body desirable. To the phthisiologist and the thoracic surgeon, whose attention is focused upon the effect the artificial pneumothorax or thoracoplasty has upon the tuberculous lesion per se, such by-products in the female genital system may appear incidental and of but little importance. To the patient herself, however, and to the physician who is called into consultation and who is not familiar with the alterations that may be expected, they frequently present annoying problems.

Tuberculosis in any form can no longer be regarded as a disease of any one organ or system but must be recognized as a general disturbance of the economy of the entire organism. It is true that the various forms of the disease react with varying degrees of intensity upon the other systems and that in the acute forms of tuberculosis the reaction is likely to be more severe and more pronounced than in the more chronic types. As examples, one may cite bone and joint tuberculosis, which is comparatively chronic and benign and which has but little effect on the pathologicophysiology of the nervous, digestive, and genital systems, in contrast with the usual forms of pulmonary tuberculosis in which such side-effects are frequently prominent and may have a profound influence on the ultimate prognosis.

In some instances the alterations in the menses experienced by tuberculous women are transitory and will disappear with improvement in the pulmonary condition. Such a prognosis has been recognized since physicians began to interest themselves in the problems of menstruation, and its accuracy has, no doubt, been attested on innumerable occasions. To one who has had the opportunity of following a large number of tuberculous women through the months of their sanatorium residence and of observing them at intervals after the pulmonary disease has become arrested and even cured, however, the large number who continue to have menses which differ from the individual's normal habit that was established before the onset of tuberculosis is striking.

It must be emphasized that all such alterations in the menses of tuberculous women are not for the worse. We have observed, for

example, a well-defined group in whom menstruation became more nearly "normal" after the onset of tuberculosis; in some instances patients heretofore irregular began to menstruate at twenty-eight-day intervals; in others an annoying and persistent leucorrhea, frequently looked upon as evidence of a "run-down condition" or "weakness," disappeared. In an analysis of such symptoms previously reported,¹ about 10 per cent were found to have less dysmenorrhea since the onset of tuberculosis and 12 per cent more. In the face of such evidence it would appear unwise and rather savor of post hoc reasoning to dismiss the question of alterations in female genital physiology in pulmonary tuberculosis by attributing all of them to a hypothetical "toxemia" without giving due consideration to the possibility of an independent endocrine dystrophic basis for the changes presented.

In previous publications^{1, 2} we have presented studies on the pathologic physiology of the female genital apparatus in tuberculous women who have been on the dietetic-hygienic medical regime commonly employed in pulmonary tuberculosis. Comparisons were drawn between the menstrual functions before and after the onset of tuberculosis, and an attempt was made to indicate the changes qualitatively and quantitatively. In a survey of the influence of artificial pneumothorax therapy on menstruation, it was found that changes were produced in many instances and that only a few of the group reported improvements as described by Caussimon.³ Specifically, it was found that approximately one-fourth of the patients subjected to pneumothorax therapy had had changes in menstruation consisting of increased irregularity, more dysmenorrhea, amenorrhea of longer or shorter duration, and alterations in the amount of flow and length of the intermenstrual interval. The institution of artificial pneumothorax therapy may also result in an increased premenstrual fever in some instances. In a group of eleven patients one had less flow after beginning collapse therapy, one had the intermenstrual period increased from twenty-eight to thirty-five days, and in two others, the interval was decreased below the normal of twenty-eight days. One patient returned to a twenty-eight-day schedule.

The present study was made for the purpose of elucidating the influence of thoracoplasty on the menstrual function. Because the physician who has occasion to see tuberculous women is not infrequently confronted with patients in whom the menses are accompanied by functional disturbances of such severity that they undermine the patient's resistance to a point at which she can no longer make progress in the healing of her tuberculous lesion during the intermenstrual weeks, the question of prognosis without the necessity of producing an artificial menopause by radiation often arises. In other words, will a successful thoracoplasty in these women, who are

usually but not always in the group with far-advanced pulmonary tuberculosis, result in an alleviation of the disabling menstrual symptoms or will it increase them? If the latter, what does the induction of an artificial menopause offer not only to the prognosis of the thoracoplasty itself but to the ultimate general condition of the patient as well?

The following cases may be cited as illustrative of the type:

CASE 1.—Patient, aged twenty-six, married, white, was seen on Oct. 21, 1929 for a complaint of pain in the right lower quadrant. She had had pulmonary tuberculosis for a number of years for which artificial pneumothorax had been administered with satisfactory immediate results. After the lung had been allowed to reexpand there was a reactivation of the tuberculosis and the patient was now undergoing her second regime of treatment in Saranac Lake. For some time she had complained of pain in the right lower quadrant which began about four days before the onset of alternate menstruations. The pain was not considered severe until two months before the first consultation; at that time it was accompanied by a fever of 101° F. The last menstruation was unaccompanied by the pain and the temperature was only 99° F. The pain recurred, however, with the present period and has persisted even though the flow stopped about a week before she was seen. There was no change in the type, amount, or duration of the flow. Menstruation was accompanied by a sensation of weight in the pelvis. Menstrual history, 17 x 28 x 3, dysmenorrhea as noted above, moderate amount of flow, no metrorrhagia. Para 0, miscarriages none. The late puberty was attributed to anemia and streptococcal throat infections present during that time. There were no gastrointestinal symptoms although a barium meal demonstrated irregularities in the region of the ileocecal valve which were thought to be caused by adhesions. There were no urinary tract symptoms. Previous medical history included an attack of acute appendicitis at the age of fifteen, for which no operation had been performed, and several attacks of quinsy between the ages of fourteen and seventeen years. Physical examination at the first visit showed a poorly developed and nourished adult white female who appeared acutely ill. The gallbladder and kidney regions were negative. There was an indefinite, evasive and movable mass in the right lower quadrant which was not tender and too high up to be palpated vaginally. The external genitalia and vagina were healthy. The external os was small and closed. The uterus was small, firm, smooth, normally A.F. and A.V. but seemed to be pulled to the right. The left tube and ovary were negative. The right appendage could not be outlined because of tenderness but no masses were palpable. Hemorrhoids were present. Because of the patient's poor general condition it was decided to treat her symptomatically for the present.

She was seen again in April, 1930 at which time her general condition was noted to be considerably worse. She gave a history of rises in temperature to 99.4° to 101° F. beginning two weeks before the onset of each menstruation. Until two or three months ago the fever fell to normal two days before the appearance of the flow but it now continues through the period. For the past four months it has reached 101.6° F. with each menstruation and during the present one attained 103° F. She complained of occasional right lower quadrant pain which bears no definite relation to the menses as a rule but was more severe during the period just completed. The present menstruation was also accompanied by pain in the vagina. The periods are now very scant, last only a day and a half, and are accompanied by a sensation of weight in the pelvis and pain across the lower lumbar region. The physical findings were similar to those noted on the first consultation.

Because of the severity of the menstrual symptoms it was decided to employ roentgen ray therapy to induce an artificial menopause. Such treatments were started six weeks later and a total of 6 given during the succeeding five months. There was marked improvement in the entire picture and in November, 1930 the patient was subjected to the first two stages of the thoracoplasty operation which she underwent satisfactorily. Three months' amenorrhea supervened which were attributed to the x-ray treatments but could have been caused by the thoracoplasty per se. When menstruation was resumed in February, 1931 it was accompanied by a comenstrual fever of 100.4° F. and lasted eight days. In December, 1931 increased pulmonary symptoms began to appear with the menses and persisted about ten days. In January, 1932 a third stage thoracoplasty was carried out. A note in April, 1932 states that there were increased cough and expectoration with the menses and a premenstrual fever of 99° to 99.6° F. In August, 1932 a note was made that there was no increase in pulmonary symptoms accompanying the periods although the patient was not doing well. In January, 1933 there was an attack of influenza (?) with accompanying hemoptysis at the time of the menstruation. In February, 1935 a reexamination of the patient showed her to be apparently much improved and she stated that she felt better than at any time since the thoracoplasty had been done. An intercurrent attack of pneumonia terminated the picture in May, 1935 after the patient had returned to her home.

CASE 2.—Patient aged thirty-two, married, white, was seen in December, 1934, for exaggeration of her pulmonary symptoms with each menstruation. She had been under treatment for pulmonary tuberculosis for three and one-half years and at the present time was classified as a far-advanced case with cavitation in the left lung. The gastrointestinal tract was normal. The patient gave a history of increase in her chest symptoms with each menstruation since the onset of tuberculosis. These symptoms were described as being similar to those felt when one has a "cold" in the chest and were accompanied by increased expectoration and, during the last period, with a temperature of 99 to 99.4° F., which began four or five days after the flow started. She stated that she lost 1 to 1½ pounds with each menstruation. Menstrual history, 11 × 28 × 5-8, no pain, profuse flow for several years after puberty, no metrorrhagia or leucorrhea. In 1920, following an attack of influenza, the menses became irregular and a period of two to three months' amenorrhea occurred. Five roentgen ray treatments at intervals of two weeks were administered during the past summer and were followed by more regular intervals between the menses. The details of these treatments were not available. The patient felt that the sensations of pulmonary congestion during the menses were improved while the x-ray treatments were being given and no fever accompanied the periods during that time. The congestion and fever had, however, been markedly worse during the past two menstruations. Since the x-ray treatments there has been a tingling sensation in both ovarian regions. The breasts swell and are very sore at the time of the menses; these symptoms usually begin five to six days before the flow appears. Married four years, no pregnancies.

Physical examination showed a well-nourished and developed white female in whom the abdominal examination was essentially negative. The introitus was marital, the cervix long and conical, and a moderate periorificial erosion was present. The uterus was small, in normal position, and the appendages were negative.

The patient was a candidate for thoracoplasty and the question presented was whether or not some line of treatment for the menstrual difficulties should be undertaken before the operation was carried out or whether it was likely that they would disappear following the procedure. From an analogy with the experience derived from the artificial pneumothorax studies, it was deemed unlikely that the thoracoplasty would result in improvements in the menstrual picture. However, as

the patient was then considered to be in good condition for the operation, it was thought unwise to delay it any further for a trial of glandular or roentgen ray therapy and take the risk of an exacerbation in the pulmonary condition which would delay operation. It was felt that if the menstrual symptoms persisted after thoracoplasty they could then be treated.

A two-stage thoracoplasty was successfully performed in February, 1935. Uterine bleeding occurred twice during the month and was present at the time of both operations. The first menstruation after operation was normal but the second, which was ten days late, was accompanied by the onset of a pleurisy with effusion and was quite profuse. The last period appeared after a twenty-seven-day interval, was scant and painless, and was accompanied by nausea. Sufficient time, of course, has not elapsed since the operation to determine its ultimate effect on the menses but, if one may judge from the data detailed below, it is improbable that it will result in alleviation.

Such instances as these would seem to make a study of the influence of collapse therapy on menstruation highly desirable not only for diagnostic purposes but also in order that an intelligent prognosis may be made. Accordingly a group of seventy-four women upon whom thoracoplasty had been carried out at least six months before and in whom the results were considered good were questioned. Approximately half of these patients were operated upon in Saranac Lake and the remainder were secured through the cooperation of Dr. Margaret Cameron of the Royal Victoria Hospital in Montreal, Canada. As data on all the questions were not obtained in every case, discrepancies in the totals may be noted.

Of this number there were eleven patients whose menses were irregular before operation. Ten of these have since resumed a regular menstrual schedule and one has remained irregular. Of fifty-seven patients who were regular before operation, five (8.7 per cent) have become irregular. One patient who was amenorrheic before thoracoplasty resumed regular menstruation afterward.

The average number of days of flow showed no appreciable difference before and after thoracoplasty and striking individual changes were not noted. Seventy-four and three-tenths per cent showed no change; 5.5 per cent had a slight increase and 15.2 per cent reported a decrease in the number of days of flow. The patient who was amenorrheic before operation resumed menstruation after thoracoplasty with five to seven days of flow and a second patient who had menstruated regularly before operation with four or five days of flow underwent her menopause soon after the lung had been surgically collapsed (she was forty-five years of age).

In seven instances (9.4 per cent) thoracoplasty was followed by amenorrhea for one to six months with an average of four months for the group. In several additional instances the menstruation that followed the operation was delayed.

Approximately 80 per cent of the patients experienced no change in the amount of flow after operation; in 13.4 per cent it decreased appreciably and in 7.4 per cent there was an increase. In 65.6 per cent the amount of flow was considered normal before operation and in 64.2 afterward. Six patients who had a normal amount of flow before operation considered it abnormal afterward.

The incidence of dysmenorrhea remained unchanged after thoracoplasty (43.6 per cent). Of the 28 patients in the group who had menstrual pain before operation, 2 have had none since, 11 have had less, 2 more, and 13 have had no change. Of the 45 patients who had no dysmenorrhea before thoracoplasty, four (9.1 per cent) have developed an appreciable amount since operation. In several instances (7 per cent

of the group) pain described as severe and incapacitating before operation was ameliorated afterward. In no case did a slight dysmenorrhea become severe after operation.

Miscellaneous menstrual symptoms apart from dysmenorrhea were prominent. Three patients who were nauseated at the time of the menses before operation were relieved as a result of the procedure; one patient developed such nausea after thoracoplasty. Four patients complained of nervous symptoms such as vertigo and headaches before operation; since operation, this number has been doubled. Six of this latter group had no such symptoms before operation; in two instances in which the symptoms were present before operation they have since disappeared and in two instances the symptoms were unaffected by the procedure. One patient developed extreme weakness during menstruation after thoracoplasty. One patient had hemoptysis with menstruation before operation and one patient has developed such hemorrhages since operation (this patient also has profuse hemorrhages from the gums at the time of the menses although no cause is apparent).

Menstruation has been accompanied by pulmonary symptoms described as "shortness of breath," "sense of fullness in the chest on the operated side," "cough," and "increased expectoration" (negative sputum) in 7 patients (about 10 per cent) since operation. One patient who had such symptoms before operation has been relieved since.

Leucorrhea has developed in 15.2 per cent of the patients since operation. In 6.7 per cent of those who had a vaginal discharge before operation, there has been none since. In 5 per cent of the group leucorrhea appeared immediately following operation, lasted a greater or less time, and then cleared up spontaneously.

The data on the influence of thoracoplasty on premenstrual fever are incomplete and probably inaccurate because so many of the patients have not taken their temperatures regularly since returning to their homes. However, it is known that two women (3 per cent) who had no such fever before operation have developed it since. In the majority of patients in whom a premenstrual fever occurred before thoracoplasty, the procedure resulted in no change in its range or duration. A few patients noticed that whereas the premenstrual fever had been accompanied by extreme discomfort before operation, they now suffered no inconvenience or incapacity from it.

Of the six patients who had a comenstrual elevation of temperature before operation (9.3 per cent), five have shown no such rise since thoracoplasty. Three patients who had no menstrual fever before operation have developed it since and all are in poor condition. This observation would tend to bear out a previous statement that comenstrual elevations of temperature in pulmonary tuberculosis are evidence of a bad prognosis.¹

Postmenstrual fever which was present in five cases (7.8 per cent) before operation has since disappeared; in two instances such fever present before operation has continued since. Thus in five out of seven instances in which there was a postmenstrual fever the condition has been relieved as a result of the operation.

In a smaller group of thirteen women in whom the results of the thoracoplasty were considered poor or incomplete, the menstrual changes were somewhat less marked but the figures make an interesting comparison with the first group. Of this series two who were irregular before operation showed no change afterward. One patient who had been amenorrheic for two years before operation, during which time she had gained considerable weight, and in whom the procedure resulted in an 80 per cent collapse of the affected lung, began to menstruate every twenty-eight to thirty-one days after the thoracoplasty had been carried out. Of the ten patients in the group who were regular before operation two have since become irregular and one (aged forty-five years) has had her menopause. The number of days of flow decreased in two patients and five patients (exclusive of the one who passed through the

menopause postoperatively) reported less menstrual flow. With the exception of the patient who had been amenorrheic before operation, none of the group showed increased flow. Dysmenorrhea appeared for the first time in one patient after operation, and in three instances in which menstrual pain had been present before thoracoplasty, there was increased discomfort afterward. Seven of the eleven patients who answered this question suffered from dysmenorrhea. Leucorrhea appeared postoperatively in three patients in this group and decreased in two.

SUMMARY

1. The increased use of surgical procedures to collapse the affected lung in pulmonary tuberculosis makes an appreciation of the "by-products" of such operations desirable.

2. Alterations in the pathologicophysiology of the genital tract in women with pulmonary tuberculosis have long been recognized. For diagnostic and prognostic purposes, a study of the influence of the various therapeutic measures now in use is indicated.

3. In the present study on seventy-four cases it has been shown that thoracoplasty results in definite changes in the menstrual function and that, while some of these changes are obviously for the better, others would suggest still further derangement of the genital physiology.

4. The improvements noted can be explained in some instances by the general improvement in the patient's physical condition; the untoward results cannot always be attributed to an increase in the tuberculous lesion or to a further deterioration in the patient's health.

5. It would seem that the usual explanation of a "toxemia" of tuberculosis as the cause of abnormal menstruation in tuberculous women is inadequate and that the problem should be approached from the same angle and with the same broad viewpoint that obtains in the investigation of endocrine dystrophies in nontuberculous women.

REFERENCES

- (1) *Jameson, E. M.*: AM. J. OBST. & GYNEC. 25: 22, 1933. (2) *Jameson, E. M., Bristol, D. A., and Cavanaugh, S. A.*: J. A. M. A. 95: 13, 1930. *Jameson, E. M.*: Gynecological and Obstetrical Tuberculosis, Philadelphia, 1935, Lea and Febiger. (3) *Caussimon, J.*: Presse méd. 37: 1557, 1929.

Chmielewsky, W. N.: The Treatment of Condylomata With the Quartz Lamp. Monatschr. f. Geburtsh. u. Gynäk. 99: 177, 1935.

At the Kiev Woman's Clinic the quartz lamp was found often to produce regressive changes in condylomas up to disappearance. The lamp through bactericidal effect overcomes the inflammation which is responsible for the development of the condylomas. This treatment also diminishes the pain connected with these lesions.

J. P. GREENHILL.

VACCINATION DURING PREGNANCY AS A PROPHYLAXIS AGAINST PUERPERAL INFECTIONS

A PRELIMINARY REPORT

J. BERNARD BERNSTINE, M.D., F.A.C.S., AND
RALPH EDWARD OTTEN, M.D., PHILADELPHIA, PA.

(From the Department of Obstetrics, Jefferson Medical College and Department of Obstetrics and Laboratory of Bacteriology, Philadelphia General Hospital)

THE problem of immunity to puerperal sepsis has attracted the attention of clinicians and biologists ever since the bacterial origin of infection has been recognized. In 1923 and 1925 Dick et al. inaugurated a cutaneous test for the toxin of scarlet fever. Later, this test was extended to the field of obstetrics and patients were examined for susceptibility by the Dick method. These investigations added much to the knowledge of immunity to certain strains of the streptococcus and have emphasized the importance of the natural resistant agents of the body in combating and eradicating infection.

The problem in puerperal sepsis, however, goes beyond the question of streptococcic infection alone. While the most severe of the blood infections are generally due to hemolytic strains, many other morbid lesions are produced by bacilli of the colon group and various other cocci. With these facts in mind the authors have undertaken to culture the types of organisms commonly found in puerperal infection, test their effect upon laboratory animals, and by means of a vaccine made from the cultures, endeavor to elevate the immunity of the pregnant woman to puerperal infection in general.

The content of this paper has to do with the technic of preparation, the experimental trials in mice, and the results obtained by the use of the vaccine in fifty-one pregnant women. While the number of cases is at present limited, many were of such a nature as to make the results appear favorable and justify in our minds the publishing of the report.

Our first problem was to study carefully the bacteriology of the birth canal, especially the cervix and endocervix of pregnant women. The bacterial strains employed in the vaccine used in our study were obtained from the patients (pregnant women) attending the antenatal clinic of the Philadelphia General Hospital. The cases studied were picked at random and not selected, the only requirement being that the patient employed should have had no sexual intercourse for at least twenty-four hours preceding the taking of the cultures, nor to have taken a vaginal douche.

The patient thus employed was placed in the dorsal position, and a dry, sterile bivalve vaginal speculum was introduced into the vagina. The other hand, still being uncontaminated, was employed in obtaining the cultures. These were obtained from the cervix with a sterile cotton swab while the assistant immediately placed this specimen in a sterile tube containing blood agar, solidified, to prevent drying of the specimen. The second specimen was taken from the endocervix, and treated likewise. All specimens were taken to the laboratory and subcultured within thirty minutes from the time they were obtained.

CULTURAL MEDIA AND METHODS

For the purpose of isolation and identification of organisms, we employed 5 per cent defibrinated horse blood agar plates and slants, beef infusion broth, pH 7.6 and plain 2.5 per cent infusion agar plates and slants. In the case of gram-negative bacilli, their identification was made certain by their carbohydrate fermentation reactions.

Each of the two specimens was streaked to each of two blood agar plates and then the swabs were placed separately in test tubes containing 5 c.c. of beef infusion broth. One of the blood agar plates from each specimen was incubated under partial oxygen tension, the two remaining plate cultures being kept at normal aerobiciosis. The reduced oxygen tension was obtained by placing the cultures in Novy jars and partially evacuating the air by means of a Cenco-Hyvac pump. All cultures were then incubated for twenty-four hours at 37.5° C., when they were examined for growth, grossly and microscopically. The broth cultures were subcultured to blood agar plates and incubated under conditions of both normal and partial oxygen tension for twenty-four hours or longer. No culture was considered negative for growth until after an incubation period of at least seventy-two hours. No direct smears from patients were made, since we were interested only in bacterial growth. However, routine smear preparations are studied on all patients in this clinic for evidence of neisserian infection.

In the series of twenty-five cases studied we failed to recover any organisms from the cultures grown under partial oxygen tension which we did not obtain in cultures grown at normal oxygen tension. The gonococcus was conspicuous by its absence in all cultures.

The strains to be incorporated later in a vaccine were placed in pure culture on suitable media and stored at a temperature of 6° C. as soon as their isolation and identification were made.

The complete bacterial flora of the series studied is shown in Table I. We have not listed the cultural results from the cervix and endocervix separately, because we found only a slight and insignificant variation in the bacterial flora from the two sources.

PREPARATION OF THE VACCINE

The majority of the various strains of organisms incorporated in the vaccine were pathogenic for mice. Only strains which grew smoothly in broth and produced smooth colonies on solid media were employed. All of these latter strains were grown by repeated transfer in broth for four successive days and then the growth from an eighteen-hour culture was collected in sterile physiologic saline, washed once with normal saline and standardized to 2 billion per c.c. by the turbidity method, using as standards of comparison suspensions of staphylococci in gelatin of a 2 billion per

TABLE I

PATIENT	AGE	COLOR	MONTH OF GESTA- TION	STAPH. ALBUS	STAPH. AUR.	STREP. HEM.	N. H. STREP.	STREP. VIRL.	B. COLI	B. DIPH- THER- IOIDES	B. SUBT.	YEASTS	B. PROTEUS	B. FECALIS ALKAL.
1	O. McS.	26	5	+	+			+	+	+	+	+		
2	M. H.	29	5	+						+			+	
3	E. H.	23	5	+						+				
4	H. C.	31	5	+						+				
5	F. B.	27	4	+	+					+				
6	R. J.	25	4	+				+		+				
7	M. A.	21	3				+							
8	E. B.	21	6	+						+				
9	E. S.	25	5	+										
10	M. M.	27	6	+			+			+				
11	B. T.	27	3	+										
12	N. C.	24	5	+		+				+				
13	A. B.	23	7	+					+	+		+		
14	D. T.	26	4	+						+				
15	G. diM.	23	5							+				
16	C. P.	23	6					+		+				
17	M. R.	23	3	+			+	+		+				
18	C. B.	22	6	+				+		+				+
19	R. G.	20	3	+				+		+				
20	W. W.	22	6	+				+		+				
21	L. H.	20	4	+				+		+				
22	E. L.	19	5	+				+		+				
23	I. B.	23	8	+			+	+		+				
24	M. S.	27	5	+				+		+				
25	E. R.	28	5	+				+		+				
Totals				22	2	1	4	11	2	20	4	4	1	1
Per cent				88%	8%	4%	16%	44%	8%	80%	16	16	4%	4%

*Colonies hemolyzed blood agar.

e.c. concentration. All streptococci were collected by centrifuging the eighteen-hour growth obtained from cultures in beef infusion broth, pH 7.6. The remaining strains of organisms employed in the vaccine were grown on beef infusion agar slants. The eighteen-hour growth was washed from these slants with sterile normal saline, washed once and standardized as above noted.

Each of the separately collected vaccines was subcultured to blood agar to rule out contamination. The vaccines were then killed by the addition of sufficient 5 per cent alcoholic solution of thymol to make a concentration of 0.4 per cent thymol, and were stored at 6° C. overnight. On the following day each of the vaccines was diluted with an equal volume of sterile normal saline thus giving a concentration of 1 billion per e.c. These diluted vaccines were placed in sterile 60 e.c. vaccine bottles and tested for sterility by subculturing to blood agar slants, the latter being incubated aerobically and anaerobically for forty-eight hours. The bottles were then stoppered with appropriate rubber stoppers, the latter being sealed by the application of collodion. These vaccines were then properly labelled and stored continuously at 6° C. as stock suspensions of killed single type organisms from which a mixed vaccine could readily be made. The following outline summarizes the types of vaccine employed in the final mixed vaccine used in our studies (Table II).

TABLE II

	VACCINE NO. OF STRAINS	PROPORTION PER CENT
1. <i>Strep. hemolyticus</i>	5*	35
2. <i>Strep. viridans</i>	8	15
3. <i>Staph. aureus</i>	2	15
4. <i>B. coli communior</i>	2	15
5. <i>Strep. nonhemolyticus</i>	4	10
6. <i>Staph. albus</i>	10	10

*Four of these strains were recently isolated strains; 2 were isolated from the blood and 2 from the lochia of patients with puerperal infections.

When it was found that all of these individual vaccines were sterile, we prepared a mixed vaccine, varying the percentage content of the various strains of organisms according to the above designated proportions. The desired quantity of each individual vaccine was removed from the "stock" bottle aseptically with a Luer syringe and hypodermic needle and the six fractions were pooled in a small sterile flask. An equal volume of sterile saline was then added to the flask and after thoroughly mixing its contents, this final preparation was transferred to 30 e.c. vaccine bottles. These were proved sterile by subculturing and further cared for by methods above noted.

It will be noted that the last saline dilution reduced the concentration of organisms to $\frac{1}{2}$ billion per e.c., while at the same time the concentration of thymol was reduced from its original killing concentration of 0.4 per cent to a preservative concentration of 0.1 per cent. This concentration of organism and of chemical has proved satisfactory in a large series of cases observed by us. We can readily employ the necessary dosage with no demonstrable reaction attributable to the chemical preservative.

RESULTS OF TESTS ON ANIMALS AND NONPREGNANT WOMEN

It is considered inadvisable by some authorities to vaccinate women during pregnancy, but there was conspicuous lack of tangible evidence in the literature to substantiate this belief. However, before attempting vaccination of pregnant women, we employed the vaccine repeatedly in mice. We then vaccinated a series of non-pregnant women of childbearing age.

Twelve mice were divided into Groups A and B of 8 and 4 mice, respectively. Two experiments were conducted simultaneously on these groups. Group A was immunized by repeated injections of the vaccine, beginning with 0.1 c.c. and increasing the dose until nine injections had been given at regular intervals over a three-week period. The final dose was 1.0 c.c. and all mouse injections were given intraperitoneally. Ten days after the last injection, all mice of Group A were inoculated with a lethal number of living organisms obtained from young cultures of our isolated strains, one strain each of *Strep. viridans* and of *Strep. hemolyticus* being employed. This lethal dose was determined by inoculation of a series of nonvaccinated (normal) mice, when it was found that 0.5 c.c. of an eighteen-hour broth culture of streptococci was uniformly fatal in twelve hours or less. All of Group A survived, and two litters of apparently normal mice were found among these animals during the study.

Mice of Group B were subjected to single, large doses of vaccine intraperitoneally. Doses of 0.3, 0.5, 0.75, and 1.0 c.c., respectively, were given. As in Group A, these mice were observed for reactions. The two mice receiving the larger injections appeared to have a moderate reaction and were sluggish for several hours following the injection, in contrast to Group A mice which showed no reactions. However, on the days following vaccination Group B mice showed no evidence of untoward reaction and were normal in appearance. There was born a normal litter to Group B also.

Following our studies on mice, ten female patients who were already hospitalized were selected for study. These women were not pregnant, but were of the childbearing period, free from acute infectious diseases and well informed of the nature of the studies we wished to make. (Some of these patients were ambulatory while others were bedridden.) Careful records were kept in which the pulse, temperature, respiratory rate, blood pressure and urinalysis were recorded. They were observed especially for evidence of local or general reactions to the injections.

All of these women were first given an intracutaneous injection on the flexor surface of the forearm of 0.05 c.c. of the vaccine. Subsequent injections were given subcutaneously over the deltoid region at four-day intervals until a total of ten injections had been given each woman. The dosage was gradually increased from 0.05 c.c. to 1.0 c.c. at the tenth and final injection. Aside from an occasional complaint such as slight soreness at the site of injection or mild malaise, no untoward reactions were observed. Among this group of women were several post-encephalitics and cases of multiple sclerosis. Though this study was obviously not therapeutic in its aim, several of this group volunteered information to the effect that they had improved and felt better following vaccination.

VACCINATION OF PREGNANT WOMEN

The observations and results obtained by the vaccination of mice, and also of nonpregnant women of the childbearing period, were not only gratifying but encouraged us to proceed with the actual vaccination of the pregnant woman.

This study was conducted entirely on patients attending the antenatal clinics of the Jefferson and Philadelphia General Hospitals. Patients were accepted for vaccination irrespective of their past or present medical or obstetric histories, their acceptance depending only upon their willingness to cooperate in this study. Routine studies on these women consisted of the following: complete history and physical examination, urinalysis and blood pressure determination (at each weekly visit), blood Wassermann and Kahn tests. On many patients, in addition, complete blood counts and sedimentation tests were made.

This report includes the observations on fifty-one women in our series during the antenatal period, labor, and puerperium. Additional observations were also made on the babies born to these women.

Procedure (vaccination methods): All injections were given with tuberculin syringes and No. 26 gauge hypodermic needles, the skin at the site of inoculation first having been prepared by cleansing with sterile water and sponging with 95 per cent alcohol.

Each patient was first given an intracutaneous injection of 0.05 c.c. of vaccine on the flexor surface of the forearm, and then observed for local and general reactions at from one- to three-day intervals. Subsequent injections were at weekly intervals and were given intramuscularly in the deltoid region. The initial intramuscular injection was 0.1 c.c. (or 1.6 minims). Dosage was gradually increased by from 0.1 c.c. to 0.2 c.c. per injection. The total number of injections varied in the individual cases from a minimum of 3 to a maximum of 13 injections. The total volume of vaccine received during the course of immunization varied from 0.5 c.c. to 6.0 c.c. per patient.

Table III illustrates the total number of injections received.

A majority of the patients were vaccinated during the last trimester of gestation, most of the patients receiving all their injections during the last two months. Table IV illustrates the period of gestation when vaccination was given.

PATIENTS VACCINATED

Table V is representative of patients vaccinated, as to age, race, and gravida.

TABLE III

No. of injections	3	4	5	6	7	8	9	10	11	12	13
Cases	24	11	3	4	3	2	0	1	1	0	2

TABLE IV

Period of gestation (months)	5	5-6	5-6-7	6	6-7	6-7-8	6-7-8-9	7	7-8	7-8-9	8	8-9	9
Cases	0	1	1	0	0	2	1	1	1	2	6	19	17

TABLE V

Age	16-20	21-25	26-30	31-35	36-38					
Cases	10	23	13	4	1 (38 yr.)					
Race										
White	37									
Negro	14									
Gravida	i	ii	iii	iv	v	vi	vii	viii	ix	x
Cases	17	14	5	4	4	2	1	2	1	1

It will be noted in Table V that of the fifty-one patients vaccinated, thirty-four were multiparas. Twelve of the latter group gave a history of one or more complications during their previous pregnancies. The complications were as follows:

COMPLICATIONS	NO. CASES	COMPLICATIONS	NO. CASES
Hypertension	1	Spontaneous abortion	2
Cardiac disease	1	Premature stillborn	1
Eclampsia	3	Vaginal plastic operation (1932)	1
Forceps delivery and stillborn	1	Induced labor	1
Uterine abscess (operated 1933)	1	Forceps delivery with a resultant rectovaginal fistula	1
Postpartum hemorrhage	1		

There were nineteen patients with one or more complications during the present pregnancy. These were observed in the fifty-one vaccinated cases and were as follows:

COMPLICATIONS*

Badly diseased teeth	1	Gonorrhea	3
Toxemia of early pregnancy	4	Pyelitis	2
<i>Trichomonas vaginalis</i>	3	Preeclampsia	1
Hypertension, fall and separation of placenta (1 week before term)	1	Premature separation of placenta with stillbirth	1
Profuse, foul vaginal discharge (nonspecific)	4	Hypertension	1
Moderate, foul vaginal discharge (nonspecific)	1	Pulmonary tuberculosis (chronic)	1
Placenta previa	1	Rheumatism	1
Hip joint disease (shortening of right leg)	1	Mitral stenosis	1
		Syphilis	1
		Condylomata acuminata	1
		Generally contracted pelvis	1

*No patient had more than two complications, either in the past or present pregnancies.

The types of complications observed in our vaccinated group are generally accepted as factors predisposing, either directly or indirectly, to puerperal infections. It is common knowledge that local or general complications during pregnancy bear an important relationship to the incidence of puerperal morbidity. The group of complicated cases in our study demonstrates the feasibility of vaccination with regard to tolerance in the pregnant woman with abnormalities.

The delivery of these patients should be considered very carefully. We deemed it unwise for the physicians in attendance to have knowledge of the prophylactic vaccination, since it was our aim to have different men deliver these patients under the same conditions and manner as is the custom with all ward patients. This was done only to aid in obtaining results that would be impartial and unbiased.

The diagnosis of presentation and position was made during labor and confirmed at delivery. The frequency of the various positions and presentations in the series is as follows:

POSITION	CASES	PER CENT OF TOTAL
1. L. O. A.	40	78+
2. R. O. A.	5	10-
3. R. O. P.	4	8-
4. L. O. P.	1	2-
5. Breech	1	2-

It is not within the scope of this paper to give in detail a description of the labor and delivery of this entire series. Table VI illustrates the incidence of certain features of delivery which, we feel, should be taken into consideration, since it is a known fact that the conduct of labor has a direct bearing on puerperal morbidity. Twenty patients in our series delivered themselves spontaneously and without complications. The remaining thirty-one cases had operative interference or one or more complicating features.

PUERPERAL MORBIDITY

Our criteria of puerperal morbidity are based upon the accepted standards in the two institutions in which these studies were made. The morbidity in the two institutions was 15.71 per cent and 22.32

TABLE VI

FEATURES OF LABOR	CASE NUMBER																															
	4	6	9	11	12	13	14	15	16	17	20	22	23	24	25	26	27	29	30	31	32	33	35	37	38	39	41	42	43	47	48	
Febrile on admission		+		+								+							+													
Bleeding antepartum						+				+			+														+					
Labor induction															+												+					
Premature rupture of membranes																			+												+	
Forceps	+								+																+					+		
Version																+																
Episiotomy	+	+	+								+						+		+		+			+	+		+				+	
First degree tear								+							+			+														
Second degree tear					+								+										+									
Postpartum hemorrhage																											+					
Manual removal of placenta							+												+								+					
Totals	2	1	1	2	1	1	1	1	2	1	1	1	2	1	1	2	1	1	3	1	1	1	1	1	1	2	1	2	1	3	1	1

per cent, for an average morbidity of 19.01 per cent. This represents the figures on all ward cases for the months during which our patients delivered (May to December, 1934, inclusive).

In our series of fifty-one vaccinated cases, there were only three cases (5.9 per cent) that were morbid during the puerperium. A description of these morbid cases is not amiss at this time.

CASE 22.—A white patient, twenty-nine years of age, suffering from active gonorrhea and pyelitis at term. She had had two previous full-term babies. During the present pregnancy she received three injections of our vaccine at weekly intervals for a total of 0.9 c.c. of vaccine. She was admitted to the hospital four days after the last injection. On admission the patient was febrile. She delivered spontaneously in eighteen hours of a normal male child weighing 8 pounds 1¼ ounces. The position was L. O. A. She ran a febrile course until the seventh day postpartum. Five days later both mother and child were discharged in good condition.

CASE 30.—A white patient, thirty-one years of age, in her second pregnancy. She had had one spontaneous abortion at six weeks. During the present pregnancy she received six injections of our vaccine at weekly intervals for a total of 1.8 c.c. of vaccine. She was admitted to the hospital six days after the last injection. Her temperature on admission was 101° F. She delivered spontaneously in eight hours and twenty-five minutes of a normal male child weighing 6 pounds 12 ounces. The position was L. O. A. The placenta failed to separate and was not removed until seven hours later, manual removal having been resorted to. The temperature fluctuated between 101 and 104° F., during which time there was complete urinary retention and catheterization was required. The urine was loaded with pus. Her blood culture was negative. On the sixth day postpartum the patient expelled a small accessory placenta (placenta succenturiata). Following the passage of this accessory placenta, the temperature returned to normal and remained so until the patient's discharge on the twelfth day postpartum. Both mother and child were in good condition when discharged. At the time of discharge, pelvic examination of the patient revealed the uterus to be well involuted, anterior and freely movable. There was no adnexal pathology.

CASE 40.—A white patient, twenty-five years of age, in her second pregnancy. She had had one normal full-term baby. The patient suffered from chronic rheumatism throughout the present pregnancy. She was given four injections of our vaccine at weekly intervals for a total of 1.2 c.c. of vaccine. The patient was admitted to the hospital seven weeks after the last injection and delivered spontaneously in eleven hours and eight minutes of a normal female child weighing 8 pounds 1 ounce. The position was L. O. A. On the ninth and tenth days postpartum the temperature reached 101.5° F., though the patient had no complaints except for constipation. She was given a S. S. enema which was effectual, and her temperature dropped to normal and remained so. Both mother and child were discharged in good condition on the fourteenth day postpartum.

HOSPITALIZATION PERIOD

Fifty patients in our vaccinated series showed a variation from a minimum of six to a maximum of fifteen days hospitalization. One patient of the series who was delivered the eleventh time was kept in the hospital four weeks. This patient (Case 26) suffered from chronic fibroid tuberculosis and marked diastasis recti. She was sterilized, her appendix removed and the diastasis repaired. She left the hospital, much improved, fifteen days following operation.

The average number of days of hospitalization in fifty patients was 9.6. Table VII shows the number of days of hospitalization for this group.

TABLE VII

Days in hospital	6	7	8	9	10	11	12	13	14	15
Total cases	2	2	9	10	18	2	4	0	2	1

BABIES BORN OF VACCINATED MOTHERS

A study of these vaccinated patients would not be complete unless it included observations made on the newborn. There were 26 males and 25 females. The weights varied from 4 pounds 6 ounces to 9 pounds 5 ounces, the average weight being 7 pounds 4.1 ounces.

In the entire group there was but one abnormality (supernumerary digit on the radial aspect of the right hand). This was operated upon successfully, and the infant was discharged in good condition on the tenth day.

There were 50 livebirths and one stillbirth in the group, giving a fetal mortality of 1.96 per cent. The stillbirth occurred in a white primipara, twenty-eight years of age. She suffered from preeclamptic toxemia and subsequently developed a premature separation of the placenta. She was delivered spontaneously at term of a stillborn male child after twenty-one hours and forty minutes of labor. This mother (Case 23) received three injections of our vaccine at weekly intervals for a total of 0.6 c.c. of vaccine. The last injection was given eight days prior to delivery. When this woman was first observed by us, she had hypertension and edema. We do not feel that the ultimate outcome of this case bears any relation to the previous vaccination.

DISCUSSION

We feel that this study is of particular interest and importance, since we believe that anything that is able to influence the incidence of puerperal infections is worthy of careful consideration.

When we consider the figures as presented by Adair, who states that of 7,380 obstetric deaths, 40 per cent were due to sepsis, is it any wonder that there is much room for improvement, no matter how slight that improvement may be? It is not only the fatalities due to puerperal infections that harass the obstetrician, but also the resulting invalidism and the subsequent mutilating operations that are often required among those fortunate enough to survive.

Therefore, we feel that a vaccine that tends to increase the resistance of the pregnant woman against puerperal infections is of paramount importance. Of course, it would be ridiculous for any one to say that puerperal infections could be abolished entirely and forever, but on the other hand, it is not impossible that such infections may be reduced to a minimum.

Although our series consisted of only 51 cases, yet we feel that there was ample opportunity to observe the effects and workings of this vaccine. As stated before, our patients were not hand picked. In reality, they represent a cross-section of the average obstetric

practice with its associated complications such as may be observed in primiparous and multiparous women during pregnancy, labor, and the puerperium.

The safety of the vaccine was proved beyond a doubt, both in pregnant and nonpregnant women. We feel that the absence of abortions and miscarriages is a significant feature of this study.

The vaccine was administered to pregnant women with various complications in addition to their pregnant state. These complications varied in type and severity, and yet we failed to observe a single case that presented an aggravation of the preexisting condition.

There were several cases that we will mention since we feel that they will demonstrate some of the advantages of vaccination.

CASE 43.—White woman, aged twenty-six years, primipara. Complication during pregnancy *Trichomonas vaginalis*. This patient during pregnancy received thirteen injections of vaccine for a total of 6.0 c.c. Two attempts to induce labor failed. This patient was overdue. The position was L. O. A. Finally she went into labor and after twenty-nine hours and thirty minutes she was delivered by a low mid-forceps operation and a medio lateral episiotomy. The child was a male, living and well, weighing 8 pounds 8 ounces. There was an immediate, severe postpartum hemorrhage. The patient required, in addition to the immediate remedial measures to control the hemorrhage, a blood transfusion, receiving 430 c.c. of whole blood. At no time during the puerperium did this patient have fever, and she made an excellent recovery, leaving the hospital on the twelfth day.

CASE 41.—White woman, aged twenty years, primipara, no complications during pregnancy. This patient received eight injections of vaccine for a total of 3.6 c.c. Surgical induction was performed as the patient was overdue. The position was L. O. A. She went into labor and delivered spontaneously sixteen hours later. The child was a female, weighing 5 pounds 13 ounces, living and well. There was an immediate postpartum hemorrhage which was later controlled, but the patient had to be transfused. She received 350 c.c. of whole blood, yet at no time during the puerperium was she febrile and was discharged from the hospital on the twelfth day in good condition.

CASE 14.—White woman, aged thirty years, para ii; complication during this pregnancy: moderate vaginal discharge, mild toxemia of early pregnancy. She received three injections for a total of 0.5 c.c. She was delivered spontaneously at term in eleven hours and three minutes of a male child weighing 9 pounds 5 ounces. The placenta could not be delivered spontaneously, and after waiting, the diagnosis of adherent placenta was made. The placenta was removed manually and the uterus packed with iodoform gauze. At no time during the puerperium was this patient febrile, and she was discharged on the tenth day in good condition.

CASE 17.—Negro woman, aged nineteen years, para ii; complication during pregnancy: bleeding during eighth month, lateral placenta previa. She received during her pregnancy seven injections of vaccine for a total of 3.3 c.c. She went into labor; the position was R. S. A. (footling). During labor the cord prolapsed and was replaced manually, and after twenty-two hours and twenty minutes she was delivered of a male child, living and well, weighing 6 pounds 5 ounces. At no time during the puerperium was this patient febrile, and she was discharged on the ninth day in good condition.

CASE 26.—White woman, aged thirty-five years, para x, had had eclampsia with her first child. The complications during this pregnancy were hypertension on admission (blood pressure: 180 systolic, 120 diastolic) and chronic fibroid tuberculosis. This patient received three injections for a total of 0.5 c.c. of vaccine. On account of her condition, the membranes were ruptured artificially to induce labor. The membranes were ruptured for fifteen hours before the onset of labor pains. When the cervix was completely dilated, internal podalic version had to be performed, the aftercoming head forceps were employed, and the patient was delivered of a female child, living and well, weighing 6 pounds 4 ounces. At no time was this patient febrile. She made a good recovery, and four weeks later she was sterilized; and fifteen days following sterilization she was discharged.

The five cases noted above, though only a fraction of the abnormal group shown in Table VI, are sufficient to convince us that vaccination of pregnant women is advantageous. At the same time, as one may observe after studying our results, it will be noted that deleterious effects on either the mother or child are conspicuous by their absence.

After a consideration of the hospitalization period in our series, we believe that the 9.6 day average compares favorably with that of other institutions.

SUMMARY

The appalling mortality and morbidity due to puerperal infections prompted us to carry out the investigations just described.

A method has been presented whereby a suitable vaccine was prepared and used in an attempt to immunize a series of fifty-one pregnant women.

The following points may be considered salient features of this study:

1. Active immunity was conferred to mice by means of repeated injections of vaccine.
2. The safety and absence of reactions to the vaccine were first demonstrated in a series of nonpregnant women of the childbearing period.
3. Fifty-one pregnant women were given from three to thirteen injections of the vaccine without untoward reactions.
4. In the entire series of fifty-one cases, there was not observed a single abortion or miscarriage.
5. Preexisting conditions in these cases, whether acute or chronic, were not aggravated by vaccination.
6. These fifty-one patients delivered with no fatalities. The puerperal morbidity was 5.9 per cent as compared to the combined morbidity of the nonvaccinated cases which was 19.01 per cent.
7. There was one stillbirth in our series, the mother being a pre-eclamptic patient with marked hypertension and a separated placenta.

We feel that this type of vaccination of pregnant women should be included in our armamentarium of prenatal care.

We wish to thank William Richman, D. S., for his valuable assistance.

REFERENCES

- (1) *Dick, G. F., and Dick, G. H.*: J. A. M. A. 81: 1166, 1923; *ibid.* 83: 84, 1924; *ibid.* 84: 802, 1925; *ibid.* 84: 803, 1925; *ibid.* 84: 1477, 1925; *ibid.* 85: 1693, 1925. (2) *DeLee, J. B.*: Text Book of Obstetrics, ed. 6, Philadelphia, W. B. Saunders Co. (3) *Kochler and Ehrenfest*: Therapy of Puerperal Fever, St. Louis, 1925, The C. V. Mosby Co. (4) *Adair, Fred L.*: AM. J. OBST. & GYNEC. 29: 384, 1935. (5) *Feiner, David*: AM. J. OBST. & GYNEC. 29: 444, 1935.

SINGLE CONTRACTION DELIVERY IN BREECH PRESENTATION

E. T. RULISON, B.S., M.D., SACRAMENTO, CALIF.

IN THE registration areas of the continental United States of America the annual recorded live-births during the years 1928 to 1932 averaged 2,160,000. Of this number approximately 64,800 were breech babies, as the incidence of breech presentation in any large series of deliveries has been found to be approximately 3 per cent. The average fetal mortality in breech presentation at term is difficult to ascertain as our reports emanate from the maternity clinics of university hospitals for the most part, and the total number of babies delivered in these institutions is but a small fraction of the actual total, probably not more than 5,000 or 6,000 infants yearly. Inasmuch as the known average fetal mortality of fourteen reporting American clinics is in the neighborhood of 11 per cent,¹ it is probable that the mortality rate of the larger group of 55,000 to 60,000 cases in the hands of presumably less skilled operators would reflect a much higher rate. Hegar,² for instance, reports a 40 per cent mortality in the country districts of France, and Gibberd³ believes the mortality in average district practices in England is still about 40 per cent. Fetal mortality incident to breech deliveries in the three Sacramento hospitals during the year 1934 was 16.2 per cent. If we accept 20 per cent as a fair average mortality throughout the United States, we arrive at an unpleasant total of approximately 14,000 babies who perish yearly as the result of pelvic presentation.

The challenge to reduce the staggering death rate in breech presentation has been accepted by American obstetricians as will be evident by the review of the excellent contributions of Goethals,⁴ Sherman,⁵ Davis,⁶ Studdiford,⁷ Schwarz,⁸ Wilson,⁹ Piper and Bachman,¹⁰ Cornell¹¹ and others. The problem resolves itself, as many writers have so pertinently emphasized, into two general considera-

tions: First, the conversion of the more hazardous pelvic to the less hazardous cephalic presentation; and second, improved technique in the management, both antepartum and intrapartum, of the persistent cases and those not recognized until labor has begun.

Burns,¹² in a recent contribution remarks: "That new principles of treatment have not been expressed and that each writer has simply perpetuated the teachings of his predecessor is clearly evident from a perusal of the textbooks published during the past twenty or thirty years. On no important point does the treatment ever appear to be questioned, and the paucity of new ideas is everywhere remarkable."

A review of the contributions of the American authors already mentioned constitutes an answer to the lament of Burns and, while one may not be in agreement with some of the proposed changes in management, there is ample evidence that abundant conscientious thought and endeavor has been and is being directed to the problem. During the past twenty years prophylactic external version has gained acceptance as a reasonably safe maneuver and one that is successful in 70 to 80 per cent of cases when attempted between the thirty-second and thirty-sixth week of pregnancy.

Donovan¹³ lists as contraindications to external version: (1) antepartum hemorrhage, (2) placenta previa, (3) fibromyomas, (4) contracted pelvis. Resulting transverse presentation has been noted and in my experience the resulting vertex presentation frequently has been an occipitoposterior position which led to protracted labor. The mechanism of the resulting occipitoposterior position following external version is apparent from a study of the illustrations accompanying Davis'¹⁴ article. It is probable, however, that the average accoucheur would prefer to accept the responsibility of an occipitoposterior position to that of a sacroanterior position.

Goethals¹⁵ has drawn attention to the advisability of x-ray pelvimetry and cephalometry in the known persistent breech presentations, both in primiparas and multiparas. Control measurements indicate a possible accuracy within 5 mm. in 100 per cent of cases and 3 mm. in 75 to 95 per cent of cases. An absolute indication for cesarean section was found in one of his cases.

The succinct advice as to management during labor so admirably stated by Wilson¹⁶ is a crystallization of the advances made during recent years. In the ordinary type of breech presentation Wilson stresses the following points:

Careful diagnosis of the presentation and accurate pelvimetry;

Gentle attempts at external version;

Avoidance of unnecessary examinations for fear of rupturing the membranes prematurely;

During labor an attitude of watchful waiting, with an anesthetic, preferably nitrous oxide, administered *to the point of analgesia only,** preparation being made in the meantime for immediate interference, if necessary;

Careful observation of the patient's general condition and the rate and rhythm of the fetal heart;

*Episiotomy** as the breech distends the vulva;

*Italics by the writer of this article.

Complete anesthesia for the delivery of the head, either spontaneously or manually, assisted by steady but moderate pressure from above. These presentations should not be subjected to manual extraction as a routine.

I am in accord with all points made by Wilson with the exception of the use of complete anesthesia and abdominal pressure on the after-coming head.

Bearing on this point Cornell¹² states: "If we wish the patient to deliver the head promptly we must not give an anesthetic to the point where she is uncooperative.

Sherman¹³ in his splendid contribution is most apposite in saying: "What should be taught is how to properly handle a breech when confronted with one and how to make the presentation a less difficult one. Since the fetal mortality in 75 per cent of the cases is due to injury to the fetus, rather than asphyxia, it is felt that the policies advocated by Polak, 'let her push and you guide' and by Caldwell and Studdiford 'hands off as long as labor is advancing' should be followed. Less haste and interference on the part of the physician will minimize trauma to the fetus and mother. Frantic haste is not necessary, but careful, deliberate, unwasted movements are essential." Sherman lists the following indications for interference: fetal or maternal distress, impacted breech, tonic uterus, no advance with full dilatation for three hours, and no advance into the inlet in slightly contracted pelvis. He condemns operative interference as a routine to lessen fetal mortality. With DeLee he questions whether an infant mortality of 6 to 10 or even 15 per cent justifies an operation which has a 2 to 16 per cent maternal mortality. In teaching services he advocates careful supervision by the attending staff, considering even spontaneous delivery an operative maneuver. Sherman advocates the semi-Walcher position for delivery, episiotomy, anterior or posterior delivery of the upper extremities, and the Martin-Wiegand technic as least dangerous in delivery of the after-coming head. He refers to anesthesia as a factor making delivery of the head easy or difficult but unfortunately does not elaborate this point.

A review of the contributions pertaining to breech presentation during the past ten years leaves one very well satisfied that the subject has been quite exhaustively handled from the point of view of breech extraction. Breech extraction, however, is synonymous with interference, with its consequent higher fetal mortality. The increase of successful breech deliveries or, conversely, the lessening of the incidence of breech extraction is the problem awaiting solution. It would seem that there should be more contributions emphasizing the points leading to successful breech delivery and less of the defeatist type detailing operative methods designed to eliminate or modify the second stage of labor. While the fetal mortality in certain clinics probably may be lowered by such radical methods, one must remember that probably 90 per cent of breech cases are in the hands of general practitioners and individual obstetricians throughout the country. To them proposals to eliminate the second stage by proceeding with breech extraction in all cases upon completion of cervical dilatation or to deliver by cesarean section all parturients irrespective of parity with fetuses of an estimated weight of eight pounds or more, are fraught with the danger of greatly increasing fetal mortality and

maternal morbidity. There is a fear complex evident in the minds of scores of practitioners dealing with occasional breech cases, and in my opinion it is the consideration of the many articles detailing refinement of technic in breech extraction and advocating radical procedures which engenders and fosters this unhappy state of mind. The fear of fetal mortality in the minds of obstetricians in private practice is such that elective cesarean sections are frequently advised and consummated in primiparous patients with normal pelvic measurements and average sized fetuses. The attitude of these men is due to a repetition of unhappy experiences, the conscientious care of the patient over a period of months ending in disaster for the baby after a few short hours of labor. No obstetrician is pleased with the diagnosis of breech presentation. His experience with external version is often unsatisfactory for the reason that the resulting vertex presentation frequently proves to be a persistent occiput posterior, subjecting his patient to a hard protracted labor.

The design of this paper will be fulfilled if in any degree a sense of confidence in the successful outcome of breech presentations may be instilled in the minds of obstetric practitioners. No claim to originality in the successive steps of the management of breech delivery to be detailed may be made with one possible exception. During a period of twenty-two years' practice of obstetrics an attitude of extreme uncertainty as to the outcome has gradually changed to a fair degree of confidence. The higher fetal mortality of the first five years was due not so much to inexperience as to an improper conception of the problem of management established during student and interne years. My conviction is that the salient points in successful breech delivery were not stressed in training, and I am certain that the same condition obtains today in many of our best schools and maternity hospitals. The younger obstetricians are now observed to be passing through the same unhappy ordeals that were my share twenty years ago. It has been said of certain eminent cataract surgeons that their success was attained through the sacrifice of a "hatful" of eyes. Must the obstetrician be faced with the necessity of sacrificing a number of babies? The departments of obstetrics in some of our schools and the staffs of certain of our maternity hospitals are unconsciously but certainly sending forth men yearly with astigmatic vision of this problem. The faulty attitude of many of these men at the beginning of their obstetric work is in a large measure the result of failure to recognize that the conduct of labor in breech and cephalic presentations should be disparate in several important essentials.

The first normally rapid breech birth which I witnessed was that of a Japanese woman in the hands of a midwife. The beautifully easy and rapid mechanism of delivery with the patient awake and in full

possession of her expulsive forces was most impressive and prompted an immediate change in my attitude and management of these cases.

If delivery of breech cases is to be repeatedly successful the present-day obsession for total amnesia and analgesia through the administration of drugs which in the slightest degree interfere with uterine contractions and abdominal expulsive forces, not only must be restricted but entirely overcome. Judicious use of certain analgesic drugs may be employed to advantage in the occasional case which tends to early exhaustion by reason of an unstable nervous organization. But, as DeLee¹⁹ says: "Time and pain are secondary considerations in normal cases. It is the demand of the doctors and patients for quick, painless labors that keeps up the high fetal and maternal mortality in the United States." Interference with the expulsive forces summons the chimera of impaction; and the usual "relief" of "impaction" by bringing down one or both legs, followed by breech *traction*, spells disaster in many instances. A study of the statistics in breech presentations indicates clearly that fetal mortality is entirely proportionate to the use of analgesic drugs and interference, both manual and instrumental.

AUTHOR'S TECHNIC

Prenatal Care.—One element in prenatal care has not been sufficiently stressed, namely, consideration of the increase in maternal weight. This should be carefully watched in all primigravidas regardless of presentation, with the purpose in mind of limiting the fetal weight to an extent commensurate with safe passage through the birth canal of the individual patient. The principles involved are commonly known and not within the scope of this paper.

The writer assumes in the management of delivery herein detailed that no disproportion has been determined by x-ray or other observation in the diameters of the pelvis or the fetal head.

Management During Labor: First Stage.—The management of the patient in the first stage of labor is not affected by the diagnosis of the four positions of pelvic presentation, nor by the variation in the attitude of the lower extremities of the fetus, whether complete, frank, or half breech.

Early rupture of the membranes necessitates an immediate examination of the patient to determine the presence or absence of cord prolapse. If present, its replacement of course should be attempted at once by the usual methods. The facilities of a good hospital delivery room are not essential but highly desirable, especially in primiparas. The patient should be prepared locally according to the standardized maternity routine, including cleansing enemas. Vaginal instillation of 8 c.c. of 1-500 metaphen solution or 3 per cent mercurochrome every eight hours according to Mayes' technic may result in possible lessening of morbidity during the puerperium. The patient should be confined to her bed during the first stage of labor with a view to the better preservation of the membranes. Abdominal and rectal examinations should be made at intervals deemed advisable by the attendant. Liquid nourishment may be given every two or three hours.

The patient should be informed that her baby is coming "foot first" to insure her full cooperation. In private practice patients have learned to expect drugs and anesthetics to alleviate the pains of childbirth. It is well in breech cases to discuss

the situation frankly with the patient but in a manner not to cause alarm or apprehension. The patient should be told that the baby may be born "foot first" safely in most instances, but that the breech is soft and does not dilate the parts quite as rapidly as the head. She is told that it is therefore important that nothing should be given in the way of drugs to interfere with the natural contractions of the uterus or the voluntary bearing down in the final stage of birth. The patient should be assured, however, that "gas" will be given before the baby is born.

Second Stage.—The patient should be under the obstetrician's observation in the delivery room throughout the entire second stage. If the presenting part makes satisfactory progress in its descent, the patient may be left to her own devices as to position and bearing down efforts. At times it is advisable to place the patient in an extreme lithotomy position and coach her carefully, pain by pain. The mentality and behavior of the individual patient differ widely; therefore the attendant must decide which method of handling will best conserve maternal energy. During the last hour of the second stage the anesthetist may be present and prove to be a source of comfort to the patient. The anesthetist, however, must completely abandon any preconceived ideas of analgesia or anesthesia. It is absolutely necessary that the obstetrician specify the percentage of nitrous-oxide-oxygen to be used. Theoretically, nitrous-oxide-oxygen analgesia does not impair the expulsive forces, yet how many times in actual practice have we seen a progressive advance of the presenting part arrested soon after the ministrations of the anesthetist? A mixture of 40 per cent nitrous-oxide and 60 per cent oxygen admittedly will not produce a satisfactory analgesia, nor will it interfere with the back-log of maternal energy necessary for the final step in delivery. Five or six inhalations at the onset of each contraction, however, does satisfy the patient that an effort is being made to alleviate her distress.

In the case of a frank breech with an apparent disproportion between the size of the fetus and the birth canal, experience and careful observation of the condition of the mother and fetus at frequent intervals become the obstetrician's best allies. A most refined judgment is at times necessary to determine the timing of interference should impaction threaten. Impaction is synonymous with maternal exhaustion. Maternal exhaustion imposes upon the obstetrician the mandate of breech extraction with its multitude of attendant evils. Patience and the reflection that, while the breech is a poor dilator, nevertheless dilatation will occur in most instances if nothing has been done to detract from the efficiency of the expulsive forces, frequently lead to a happy, spontaneous, safe delivery. The notion that extended legs act as splints, thereby preventing lateral flexion and progressive descent, has been responsible for many instances of needless interference. Jardine²⁰ has pointed out that "for the lower extremities to act as splints they must be rigid and fixed at both ends. They are not fixed at the lower ends and it is possible for the lower extremities to bend laterally at the knees sufficiently to allow lateral flexion." The patient is coached with each pain to "bear down" and as the presenting part begins to distend the perineum, the latter may be ironed out digitally, care being taken not to permanently damage the fascial planes or cause submucous tears of the perineal muscles.

The patient's bladder should always be thoroughly evacuated by catheter as the presenting part comes in view. It is advisable of course to have obstetric forceps and resuscitation paraphernalia at hand in event intervention becomes necessary. The management of the delivery from the beginning of perineal distention becomes one of *exact timing step by step*. As the presenting part in its advance begins to swing ventrally beneath the pubic arch the patient should be given primary nitrous-oxide-oxygen anesthesia to permit mediolateral episiotomy by scalpel. Infiltration of the perineal skin, vaginal wall and deeper tissues with 1 per cent novocaine is

an excellent alternative to primary gas anesthesia. In the case of the right-handed obstetrician, the episiotomy naturally will be to the patient's left. Episiotomy on the side to which the presenting sacrum points is a refinement stressed by some authors. The depth of the episiotomy is determined by the estimated size of the fetal head, the width of the outlet and the character of the musculature of the perineum. In primiparas and multiparas with virginal type of perineum, the incision should be a generous one, carried even into the levator ani muscle if deemed necessary. As DeLee²¹ has emphasized so well: "It saves delay in the delivery of the shoulders and head and surely has saved many babies' lives as well as prevented complete lacerations of the perineum." The anesthetic is stopped immediately following the episiotomy, and time is allowed for satisfactory resumption of expulsive pains. The presenting part is kept covered by the customary hot towel, although as Gibberd²² remarks: "It is unnecessary in an easy case, an impediment in a difficult one, and probably in no case does it prevent inspiration by the fetus." A hypodermic injection of Infundin (mm. iii) or obstetrical pituitrin (mm. vi) may now be given to insure more efficient and better sustained contractions.

The writer offers as his opinion that the design for the actual delivery of the baby in the normal uncomplicated case should be birth from breech to and including head *during the period of a single contraction*. The stage must be carefully set for this final maneuver which in time is a matter of *seconds* only. The patient lies in a lithotomy position with high stirrups or in a semi-Walcher position with the lower extremities in saddle stirrups as recommended by Piper and Bachmann, Sherman and others. The semi-Walcher position undoubtedly relaxes the perineal muscles and increases the anteroposterior diameter of the inlet, both considerations being of importance at this juncture. Some women, however, are less successful in consistently advancing the presenting part in their expulsive efforts in this position. The anesthetist is now giving *straight oxygen* with each pain. The uterine contractions are becoming more and more forcible as the pituitrin effect is established. The nurse is not permitted to touch the abdomen and the obstetrician should not be annoyed immediately before delivery by an attendant detailing the character or rate of the fetal heart. He should be the sole judge of the onset and character of the contractions. The presenting part is easily restrained and may be permitted to come well through the outlet and pushed back without endangering the fetal circulation. This maneuver insures complete effacement and paresis of the cervix and lower birth canal. The crucial moment arrives when the contraction has a maximal, well sustained, expulsive force. The patient is now instructed to bear down well and continue to bear down. The breech and lower extremities are received and at the emergence of the cord, a loop is drawn down gently. Manual aid is always given to accomplish the delivery of both arms as it is time saving. It is greatly simplified as a result of the episiotomy. As the scapulae come into view the body is gently swung laterally and the posterior arm swept out by the homolateral hand of the operator. Rotation to bring the anterior arm into the hollow of the sacrum is then done, to the left or right depending upon the original position, and the second arm is delivered. Manual aid in delivery of the arms is surprisingly amplified by the continued advance of the baby due to the sustained uterine contraction and the continued voluntary bearing-down effort of the patient. The emergence often assumes a moderately projectile character although this is probably more apparent than real. The delivery to this point should be accomplished while the pain is but reaching its height. The head is still within the uterine cavity; the contraction of the uterine musculature in its climactic period expels the head into the vagina. Expulsion of the head into the midpelvis is aided by momentarily allowing the fetus to hang downward. As Burns²³ has pointed out, this maneuver permits the shortest diameters of the fetal head, the occipitofrontal and occipitobregmatic, to roll down-

ward through the brim, adequate head flexion being assured. It now remains merely to lift the child by the feet, using the left hand while guarding the perineum with the right, and delivery is complete. In lifting the child it is held by the ankles and the obstetrician's left hand swings upward through an arc of about 180 degrees. With the patient consciously bearing down, no tension or traction on the body is required. Rather is it necessary to focus attention on the protection of the perineum, as the head in many cases advances forcibly. While the rapid delivery of the head following the appearance of the mouth is not imperative, there is likewise no particular advantage in a slow delivery if an adequate episiotomy has been performed. The usual time consumed for cord to head delivery is rarely over thirty seconds, and many deliveries have been effected in fifteen to twenty seconds. In a recent case of a primipara with a minor degree of just minor contraction, the baby weighing 7 pounds 10 ounces was delivered from cord to complete birth of head in ten seconds without apparent injury to baby or mother.

The management detailed above pertains, as stated previously, to cases of breech presentation in primiparas or multiparas with normal pelves and soft parts and average sized fetuses. The elderly primipara with long rigid cervix, the parturient with placenta previa complicating breech presentation, fetal hydrocephalus, and monstrosities are not within the scope of this paper and, of course, require treatment and maneuvers which are well standardized. The use of hydrostatic intrauterine bags in the group of cases with slowly dilating cervixes is a logical one, obviating in many instances a recourse to cesarean section.

One logically may ask what steps should be taken in the event delivery is not completed during a single contraction. Rather than risk asphyxia by awaiting subsequent contractions and hoping to effect a spontaneous delivery, it would seem wiser to proceed at once with a breech extraction under gas anesthesia. The Martin-Wiegand principle recommends it as the safest effective technique. Briefly, it consists in guiding the head through one of the oblique diameters of the inlet by suprapubic pressure of one hand while the thumb and fingers of the opposite hand maintain head flexion and exert traction. The face grip consists of thumb beneath chin and fingers on malar bones, the fetal body riding the forearm. This method of delivery of the after-coming head failing, immediate recourse to forceps of the Piper-Bachman type should be had.

PROSPECTIVE CRITICISM

It is anticipated that objection may be raised to the method of single contraction breech delivery. The criticism that immediately occurs to the mind of the obstetrician is that delivery is too rapid, precipitate in fact. We have been schooled in the avoidance of haste in delivery of the after-coming head. The warning to avoid haste and undue traction on the after-coming head is well founded, as the fear of fetal death while the nurse counts off the minutes after the appearance of

the cord often prompts the accoucheur to the use of undue force. This frequently results in the rupture of the tentorium cerebelli with intracranial hemorrhage, injury to the cervical spine or injury to the roots of the brachial plexus. In single-contraction breech delivery the after-coming head is expelled by a competent, evenly distributed *vis a tergo*. It is probably not much greater than the pressure to which the head has been subjected by the preceding second stage contractions. It is not unusual in vertex presentation for delivery to be effected during a single uterine contraction. Why then should it not be permissible to encourage delivery during a single uterine contraction in pelvic presentation? The advantages inherent in such a method seem patent. The absence of asphyxia and postnatal cerebral complications furnishes proof that the method is not injurious to the baby. Many of these babies have been under observation over a period of several years.

Another criticism that may be offered is that the rapid delivery may predispose to premature separation of the placenta and to postpartum hemorrhage. While my experience has been confined to my private cases and is therefore limited, the method has been used in its present form for several years and no instance of serious postpartum hemorrhage has been encountered. It has been my observation as well as that of many others that the placenta separates somewhat earlier than in cephalic presentation and there are, no doubt, many instances of premature separation. Intrapartum placental separation is rather an argument in favor of single contraction breech delivery inasmuch as the fetus is delivered in a few seconds and thus is not exposed to asphyxia which so often occurs during more protracted birth.

Does the method predispose to rupture of the perineum? If an adequate episiotomy has been performed no fear need be had of any laceration whatever. Delivery of the head following emergence of the mouth may be as slow and deliberate as the individual operator may elect.

Another query that is certain to be advanced is: "Why deliver the baby in thirty seconds when authorities agree that four minutes (Tweedy-Wrench) to twenty minutes (Potter) may elapse before the fetus develops asphyxia?" The writer elects the feminine manner of replying to this by countering: "Why consume valuable minutes with their attendant period of apprehension on the part of the accoucheur and distress to the patient if only a few seconds are necessary?" We must remember that the success of this method of delivery rests upon the premise that the patient remain conscious and cooperative, and accordingly a birth as rapid as is compatible with the safety of mother and child is indicated.

Finally, has there been complaint on the part of mothers that they have been forced to suffer unnecessarily? No such complaint has been registered by any of my patients. If such were the case, there may be justification in the fact that the pains of childbirth are soon forgotten, but the wound inflicted upon the mother by the unhappy intelligence of her baby's failure to survive is one which requires years to heal.

SUMMARY

Approximately 65,000 breech babies are born yearly in the United States. About 14,000 of these perish as a result of pelvic presentation.

As the great majority of these are delivered by private practitioners, management to increase the percentage of spontaneous deliveries is desirable.

A review of cases encountered in private practice over a period of twenty-two years is used as the basis of this contribution.

ESSENTIAL CONSIDERATIONS IN SINGLE CONTRACTION BREECH DELIVERY

1. Prenatal dieting and exercise to avoid an oversized fetus and to promote the best possible physical condition of the mother. This, of course, applies to all parturients.

2. Avoidance of analgesic drugs during the first stage of labor in the average normal case; judicious use of these agents in the occasional case which tends to early exhaustion due to unstable nervous organization.

3. Careful coaching by obstetric attendant during expulsive pains.

4. Delivery in lithotomy or semi-Waleher position.

5. Subanalgesic nitrous-oxide-oxygen (40 per cent nitrous-oxide, 60 per cent oxygen) during pains of the last hour. One hundred per cent oxygen immediately preceding actual delivery.

6. Liberal mediolateral episiotomy as perineum reaches full distention, performed by scalpel under transient gas anesthesia or novocaine infiltration.

7. Administration of obstetric pituitrin or infundin.

8. Delivery during the period of a single maximal, well-sustained contraction, accurate timing being of primary importance.

- a. Delivery of lower extremities, torso and upper extremities *before* contraction has reached its climax; routine manual aid in the delivery of arms.
- b. Momentary dependent position of fetus as after-coming head is expelled by uterine contraction into the lower birth canal.
- c. Delivery of head by raising fetus through an arc of 180 degrees by the left hand, as perineum is guarded by the right hand.

STATISTICAL DATA (MY CASES)

Breech presentation has occurred in 5 per cent of my cases. There were twenty-two instances in primiparas and twenty-one in multiparas. Prophylactic external version was successful in five cases in multiparas and failed in two cases in primiparas. Spontaneous delivery occurred in 68 per cent of the 43 cases. Since the adoption of the management above described in the full-term group of twenty-six cases delivered per vaginam there has been a loss of one baby, a fetal mortality of 3.8 per cent. In this instance, the mother, a preeclamptic primipara, not under my prenatal care, entered the hospital after fourteen hours of labor, fully dilated with membranes ruptured and fetus showing signs of distress. Delivery was accomplished under ether anesthesia by breech extraction. Two patients were delivered by cesarean section, the indication being large fibromyomas in one, contracted pelvis in the other. In the total group of forty-three cases, including four patients delivered at a period of gestation from the twenty-eighth to the thirty-second week, and five patients delivered following prophylactic external version, seven babies failed to survive, a fetal mortality of 16.3 per cent. One death occurred in utero following an easy external version. A macerated fetus was delivered twenty-five days later. Placental disease rather than external version was undoubtedly responsible for the death of the fetus. The delivery mortality of the total group was 11.6 per cent. Excluding the four premature cases and the five patients delivered following external version, there were three deaths or a mortality of 8.8 per cent. Two of these patients were delivered by breech extraction following conduct of labor by midwives. One patient had been in labor for eighty hours.

The maternal mortality was nil.

The average fetal weight in the twenty-five full-term cases without mortality, delivered according to the methods described, was 7.4 pounds in primiparas and 7.9 pounds in multiparas. One primipara was delivered of a fetus weighing 9 pounds 4½ ounces; one multipara was delivered of a fetus weighing 10 pounds 9 ounces. The average duration of labor in this group was 14.6 hours in primiparas and 16.6 hours in multiparas. Excluding the case of protracted labor of seventy-two hours in one of the multiparas, the average duration of labor in this group was 10.5 hours.

Hydrostatic bags were used in nine of the 43 cases, or 20 per cent.

ANALYSIS OF INTRA- AND POSTPARTUM FETAL DEATHS

	PRIMIPARAS	MULTIPARAS
Premature, spontaneous	1	1
Full term, breech extraction	2	1
Full term, following external version		1
Total: 6 deaths in 43 cases		

PREMATURE SPONTANEOUS

CASE 1.—Multipara (Grav. iii), aged thirty, eclamptic in twenty-eighth week of pregnancy; induction of labor by Voorhees' bag; convulsion eight hours before delivery was probable cause of death in utero; fetal weight 4 pounds, length 41 cm.

CASE 2.—Primipara, aged twenty-seven, in the thirty-second week of pregnancy; injured by accidental blow on abdomen a day previous to onset of labor; spontaneous delivery; fetus died forty-five minutes after birth. Autopsy disclosed no brain injury; congenital absence of right kidney; fetal weight 5 pounds 5 ounces.

FULL TERM—BREECH EXTRACTION

CASE 1.—Primipara, aged thirty-five, spontaneous rupture of membranes five hours before onset of pains. Full dilatation after seven hours' labor. Interference by

bringing down both feet. Breech extraction under ether anesthesia. After-coming head delivered by forceps. Weight of fetus 8 pounds. This patient was delivered in 1913.

CASE 2.—Primipara, aged twenty-eight, preeclamptic delivered by breech extraction under ether anesthesia after fourteen hours' labor. Under midwife's care before admission to hospital. Indication for breech extraction preeclamptic condition of mother and signs of fetal distress. Difficulty experienced with extended arms and after-coming head. This patient was delivered of breech babies in three successive years. The second and third deliveries were spontaneous, the babies weighing 8 pounds 9 ounces and 10 pounds 9 ounces, respectively.

CASE 3.—Multipara (Grav. x) under midwife's care for eighty hours. Impacted frank breech; mother exhausted. Breech extraction under chloroform, home delivery. Heart beat for thirty minutes after delivery; no autopsy.

DELIVERY FOLLOWING EXTERNAL VERSION

Patient, a gravida vii, with history of five instrumental labors and one still-birth following breech delivery three years previously; five living children; external version at the thirty-sixth week; induction of labor ten days before term; external version repeated at the time of induction of labor; head failed to engage. Axis-traction forceps applied with occiput left and occiput right. Fetus delivered following internal podalic version with forceps to after-coming head.

The irreducible minimum in fetal mortality in my group of 43 cases might have been attained had the two full-term primiparas delivered by breech extraction been permitted to continue longer in the second stage of labor without interference, and the multipara (Grav. vii) subjected to cesarean section.

It would seem that despite congenital absence of one kidney disclosed at autopsy the premature baby of the primiparous patient should have survived, the delivery having been a short, spontaneous one.*

Of the seven fetal deaths two occurred in utero, one following an intrapartum eclamptic convulsion, the other resulting from placental disease several days before the onset of labor. The death of one premature was ascribed to shock accompanying spontaneous labor. Four deaths were due to asphyxia and probable intraeranian injury accompanying difficult breech extraction under anesthesia.

REFERENCES

- (1) *Sherman, J. T.*: Bull. Lying-In Hosp. City of New York 13: 344, 1932.
- (2) *Hegar*: Quoted by J. T. Sherman: Bull. Lying-In Hosp. City of New York 13: 344, 1932.
- (3) *Gibberd, G. F.*: J. Obst. & Gynec. Brit. Emp. 34: 509, 1927.
- (4) *Goethals, T. B.*: AM J. OBST. & GYNEC. 26: 715, 1933.
- (5) *Sherman, J. T.*: Bull. Lying-In Hosp. City of New York 13: 344, 1932.
- (6) *Davis, M. E.*: Surg. Clin. North America 12: 1193, 1932.
- (7) *Studdiford, W. E.*: J. A. M. A. 99: 1820, 1932.
- (8) *Schwarz, O. H.*: South. M. J. 25: 162, 1932.
- (9) *Wilson, K. M.*: N. Y.

*Of eleven deaths in sixty-eight breech cases delivered in the Sacramento hospitals in 1924 six were premature of the period of viability. How fetal shock in the premature group may be lessened is a problem which demands serious consideration on the part of the profession.

UNIVERSITY OF WASHINGTON
SCHOOL OF NURSING
HARBORVIEW DIVISION.

OBERST-PLASS: WATER CONCENTRATION OF BLOOD DURING PREGNANCY 61

State M. J. 30: 389, 1930. (10) Piper, E. B., and Bachman, C.: J. A. M. A. 92: 221, 1929. (11) Cornell, E. L.: Surg. Gynec. Obst. 49: 361, 1929. (12) Burns, John Wm.: J. Obst. & Gynec. Brit. Emp. 41: 923, 1934. (13) Donovan, H. C. E.: Med. J. Australia 2: 617, 1932. (14) Davis, M. E.: Surg. Clin. North America 12: 1193, 1932. (15) Goethals, T. R.: Am. J. Obst. & Gynec. 26: 715, 1933. (16) Wilson, K. M.: N. Y. State M. J. 30: 389, 1930. (17) Cornell, E. L.: Surg. Gynec. Obst. 49: 367, 1929. (18) Sherman, J. T.: Bull. Lying-In Hosp. City of New York 13: 344, 1932. (19) DeLee, J. B.: Year Book of Obst. & Gynec. p. 9247, 1934. (20) Jardine, Robert: Compend. Med. & Surg. 5: 103, 1927. (21) DeLee, J. B.: Principles and Practice of Obstetrics, Philadelphia, 1916, W. B. Saunders Company, p. 627. (22) Gibberd, G. F.: Brit. M. J. 2: 369, 1931. (23) Burns, J. W.: J. Obst. & Gynec. Brit. Emp. 41: 923, 1934.

WATER CONCENTRATION OF THE BLOOD DURING PREGNANCY, LABOR, AND THE PUERPERIUM*

FRED W. OBERST, PH.D., AND E. D. PLASS, M.D., IOWA CITY, IOWA
(From the Department of Obstetrics and Gynecology, State University of Iowa)

IT IS generally agreed that pregnancy is associated with a definite blood dilution and with a corresponding increase in total blood volume. It has, moreover, been suggested that these factors may explain the diminished red-cell count and lowered hemoglobin concentration commonly observed during gestation and frequently thought to be clinically significant. This study is concerned with the moisture content of plasma and cells in relation to variations in the plasma proteins and the cell hemoglobin.

Nasse,¹ Jones,² Zangemeister,³ and Polowe⁴ have observed a decrease in the specific gravity, while the observations of Plass and Bogert,⁵ and others, on the plasma proteins indicate an increased hydration of the blood plasma with a maximum dilution during the middle of gestation and a subsequent concentration as term is approached. Stander and Tyler⁶ found that "after the first month, which may be attended with a low plasma moisture, the water increases gradually to the fifth month, after which it falls slowly until the time of labor." Schmidt, Bickenbach, and Jonen⁷ have noted an increase in the water content of the blood of dogs during gestation. Direct determinations by various methods, Kaboth,⁸ Gueissaz and Wanner,⁹ Miller, Keith, and Rowntree,¹⁰ Stander and Crendick,¹¹ Bohnen and Borrmann,¹² and Dieckmann and Wegner¹³ have confirmed the indirect evidence pointing toward an increased total blood volume during pregnancy.

SUBJECTS

The subjects of the study included 20 pregnant women (10 primigravidas and 10 multigravidas), 10 parturient women, 10 puerperal women, and 10 nonpregnant women, who served as controls. The pregnant women were in the latter part of the third trimester of pregnancy. All of the obstetric patients were chosen from the Maternity Ward of the University Hospitals and were clinically free from

*Presented before the meeting of the American Society of Biological Chemists at Detroit, April 10 to 13, 1935.

disturbing disease conditions, while the nonpregnant group consisted of nurses, and of patients with minor complaints who were on the gynecologic wards. All individuals were given an ordinary mixed diet, and, except for the parturient and puerperal patients, were not confined to bed.

METHODS AND CALCULATIONS

Blood from the adults was obtained some hours after the last meal, except that in the group of parturient women it was drawn at the beginning and again at the end of labor as the occasion demanded. Cord blood was obtained from the children born to mothers who were studied during labor and was aspirated from the umbilical vein before the cord was ligated. All collections were made anaerobically and stasis was avoided. Heparin was employed to prevent coagulation in the portion which was used for the determinations of cell volume, hemoglobin content, specific gravity, and water concentrations, while the remainder was transferred without contact with air to a centrifuge tube containing oil and sodium oxalate. After centrifuging, the plasma was removed for determination of its protein and non-protein nitrogen contents.

Cell volume was determined in Plass and Rourke¹⁴ sedimentation tubes after rotation for thirty minutes at approximately 3,000 r.p.m.

Specific gravity was determined by transferring (blowing out the last drop) 2.0 c.c. of plasma or whole blood from an Ostwald-Folin pipette into a tared 25 c.c. crucible and weighing to the fourth decimal place. After drying the specimen to constant weight in an oven at 105° C., the water content was determined by difference. The specific gravity of the cells was calculated by the formula:

$$\text{S. G. cells}^* = \frac{100 (\text{S. G. of W. B.}) - \text{S. G. of Pl.} \times \text{Pl. Vol.}}{\text{Cell volume}}$$

*Hg.=Hemoglobin

Kg.=Kilogram

W.B.=Whole blood

S.G.=Specific gravity

G.=Grams

Pl.=Plasma

Vol.=Volume per cent

The water concentration of the cells was calculated by the formula:

$$\frac{\text{G.H}_2\text{O per 100}^*}{\text{c.c. cells}} = \frac{100 (\text{G.H}_2\text{O per 100 c.c. W. B.}) - \text{G.H}_2\text{O per 100 c.c. Pl.} \times \text{Pl. Vol.}}{\text{Cell volume}}$$

CELL VOLUME

RESULTS

TABLE I

MATERIAL	CELL VOLUME PER CENT*	
	AVERAGE	RANGE
Normal nonpregnant women	39.7	34.0-46.5
Late normal pregnancy, primigravidas	36.1	29.2-42.0
Late normal pregnancy, multigravidas	34.6	30.5-37.6
Early in labor	39.3	35.0-44.0
At delivery	41.4	37.2-47.2
Postpartum (7 to 9 days after delivery)	42.7	39.0-53.0
Umbilical cord blood	52.1	42.2-60.2

*In order to conserve space, only maximum and minimum values and averages are recorded in this and subsequent tables.

The water content per kilogram of whole blood, plasma, or cells was obtained by dividing the water per 1,000 c.c. by the approximate specific gravity as determined or calculated.

Hemoglobin concentration was calculated from the oxygen capacity values obtained by the manometric method of Van Slyke and Neill¹⁵ and the gas apparatus and technic of Van Slyke.¹⁶ After subtracting 0.5 volume per cent from the observed oxygen capacity to allow for the dissolved or free oxygen, the result was multiplied

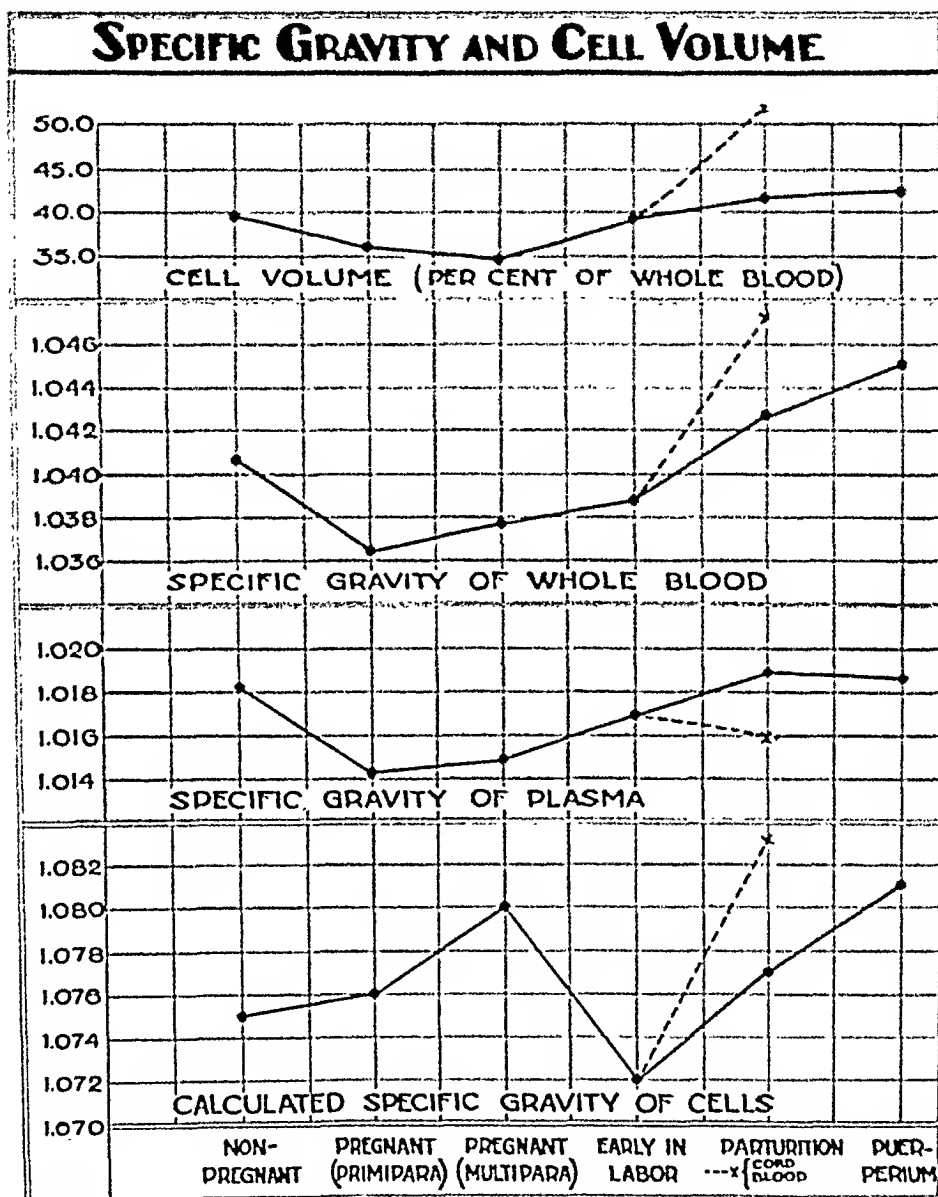


Chart 1.

by the conversion factor, 0.746. (Oxygen capacity in volumes per cent $\times 0.746$ = grams hemoglobin per 100 c.c. blood.) The hemoglobin content per kilogram of cells and per kilogram of water was calculated from the hemoglobin per 100 c.c. whole blood, the cell volume and specific gravity of whole blood, and the water content of the cells by the following formulas:

$$\text{Hg per Kg. cells}^* = \frac{\text{G. Hg per } 100 \text{ c.c. W. B.} \times 1000}{\text{Cell Vol.} \times \text{S. G. cells}}$$

$$\text{Hg per Kg. H}_2\text{O} = \frac{\text{Hg per Kg. cells} \times 1000}{\text{G. H}_2\text{O per Kg. cells}}$$

The total nitrogen of the plasma was determined by the micro-Kjeldahl method¹⁷ and the nonprotein nitrogen by the procedure of Folin and Wu.¹⁸ The protein nitrogen as obtained by subtraction was multiplied by the usual conversion factor, 6.25, to obtain the total protein percentage.

By calculations based upon these data it was possible to determine the specific gravity, water content and hemoglobin of the cells, as well as to estimate very closely the distribution of water in a given quantity (1.0 kilogram) of cells and plasma.

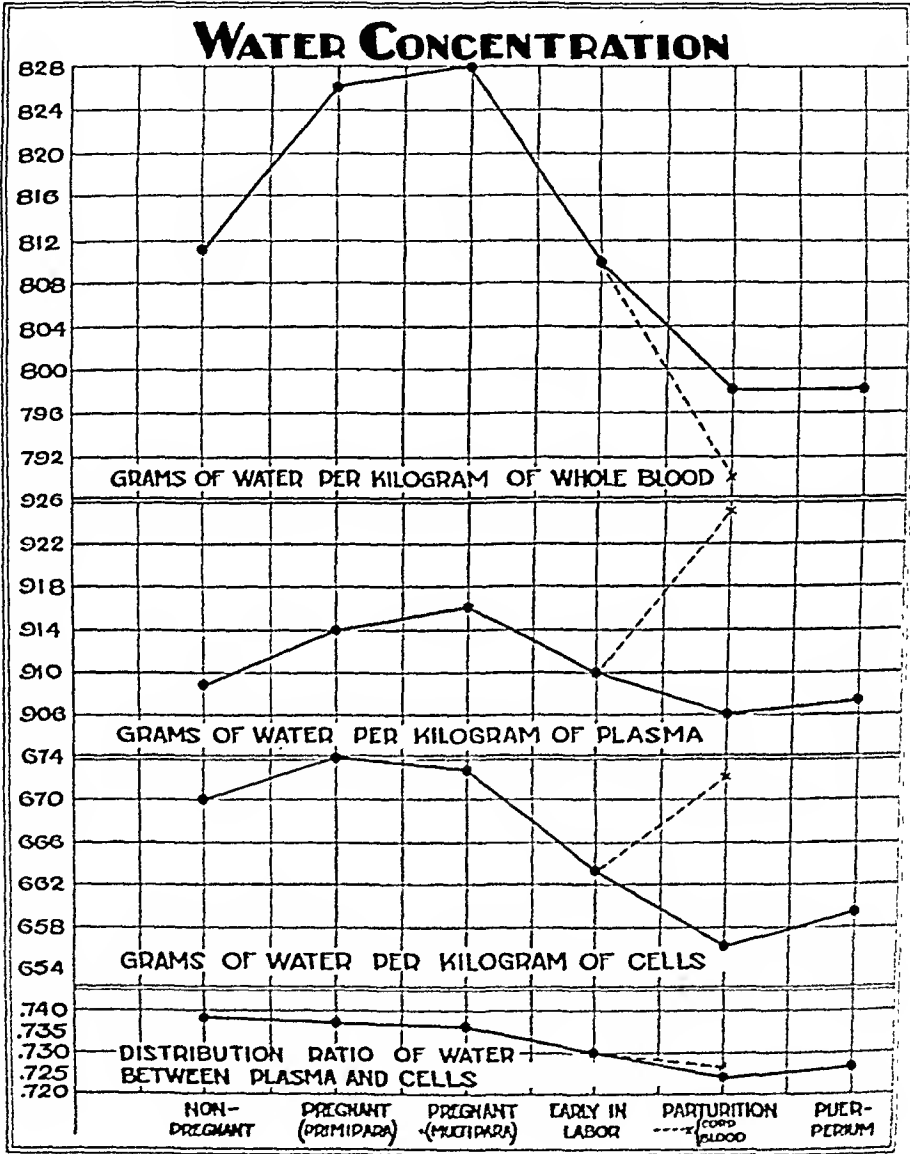


Chart 2.

The average cell volume for the ten normal nonpregnant women (39.7 per cent) (Table I) was slightly below the value given by Osgood and Haskins,¹⁹ 41.0 per cent. The diminution of cell volume in late pregnancy is apparent, with the multigravidas exhibiting a greater decrease than the primigravidas. Even at the onset of labor there is a considerable concentration of the blood, which becomes more marked during parturition. The finding of an increased cell volume early in labor may be correlated with the observation first recorded by Zangemeister² that immediately preceding parturition there is a considerable weight loss, possibly metabolic in origin.

Our observations on puerperal women do not include the first few days after delivery when there is a temporary further dilution of the blood,⁵ but demonstrate that the normal concentration has been reached by the end of the first week. The table (Table I) also confirms the previously recorded fact that cord blood has a very high cell volume.

Specific Gravity.—It is logical to expect that the specific gravity of the plasma and whole blood will vary with the cell volume since both changes are apparently dependent upon blood dilution.

The specific gravity of whole blood in normal women has been reported by Schmaltz,²⁰ Leake, Kohl, and Stebbins,²¹ and Polowe,²² as averaging 1.053, a value considerably higher than our figure of 1.041. These authors used the Barbour and Hamilton method,²³ while the values recorded here were obtained gravimetrically. In spite of this difference, and without questioning the accuracy of either procedure, it is obvious that our values are directly comparable with one another for the purposes of this study.

Thompson²⁴ found that the specific gravity of whole blood in the early months of pregnancy was usually normal or increased, but diminished progressively during the latter months, and rose again nearly to normal at parturition. He related the changes in specific gravity to alterations in the quantity of red cells. Our observations are confirmatory of this finding.

The changes in specific gravity of plasma and whole blood in Table II are consistent with the cell volume variations and associated plasma protein changes, and

TABLE II. SPECIFIC GRAVITIES

	PLASMA	WHOLE BLOOD	RED BLOOD CELLS
Normal nonpregnant women	1.0181 (1.0135-1.0232)	1.0406 (1.0328-1.0473)	1.075 (1.053-1.095)
Late normal pregnancy, primigravidas	1.0152 (1.0095-1.0195)	1.0363 (1.0300-1.0409)	1.076 (1.063-1.084)
Late normal pregnancy, multigravidas	1.0155 (1.0101-1.0206)	1.0376 (1.0335-1.0409)	1.080 (1.070-1.099)
Early in labor	1.0168 (1.0123-1.0211)	1.0387 (1.0337-1.0465)	1.072 (1.053-1.091)
At delivery	1.0189 (1.0159-1.0250)	1.0425 (1.0374-1.0470)	1.077 (1.052-1.090)
Postpartum 7-9 days after delivery	1.0186 (1.0153-1.0212)	1.0450 (1.0391-1.0505)	1.081 (1.071-1.090)
Umbilical cord blood	1.0159 (1.0127-1.0202)	1.0472 (1.0403-1.0515)	1.083 (1.075-1.099)

point to dilution as a common etiologic factor, whereas the changes in specific gravity of the cells are possibly within the limits of experimental error.

Polowe⁴ suggested that a whole blood specific gravity (Barbour-Hamilton method) below 1.050 represented a definite anemia, and, employing this standard, noted an anemia in 66 per cent of his patients in the first, 70 per cent in the second, and 83 per cent in the third trimester of gestation. During the seventh lunar month, every patient presented a specific gravity of less than 1.050. In the puerperium, 85 per cent of his patients presented an anemia, which tended to be more marked than during pregnancy.

Our findings confirm the diminution of the specific gravity of the whole blood late in gestation, but the average hemoglobin values do not indicate a significant anemia.

The specific gravity of whole blood does not vary mathematically with the hemoglobin content.

Water Content.—The water content of the plasma and whole blood was determined and that of the blood cells calculated to give the data in Table III.

The changes in water content follow those of specific gravity but are in the reverse direction, while the distribution ratio between cells and plasma

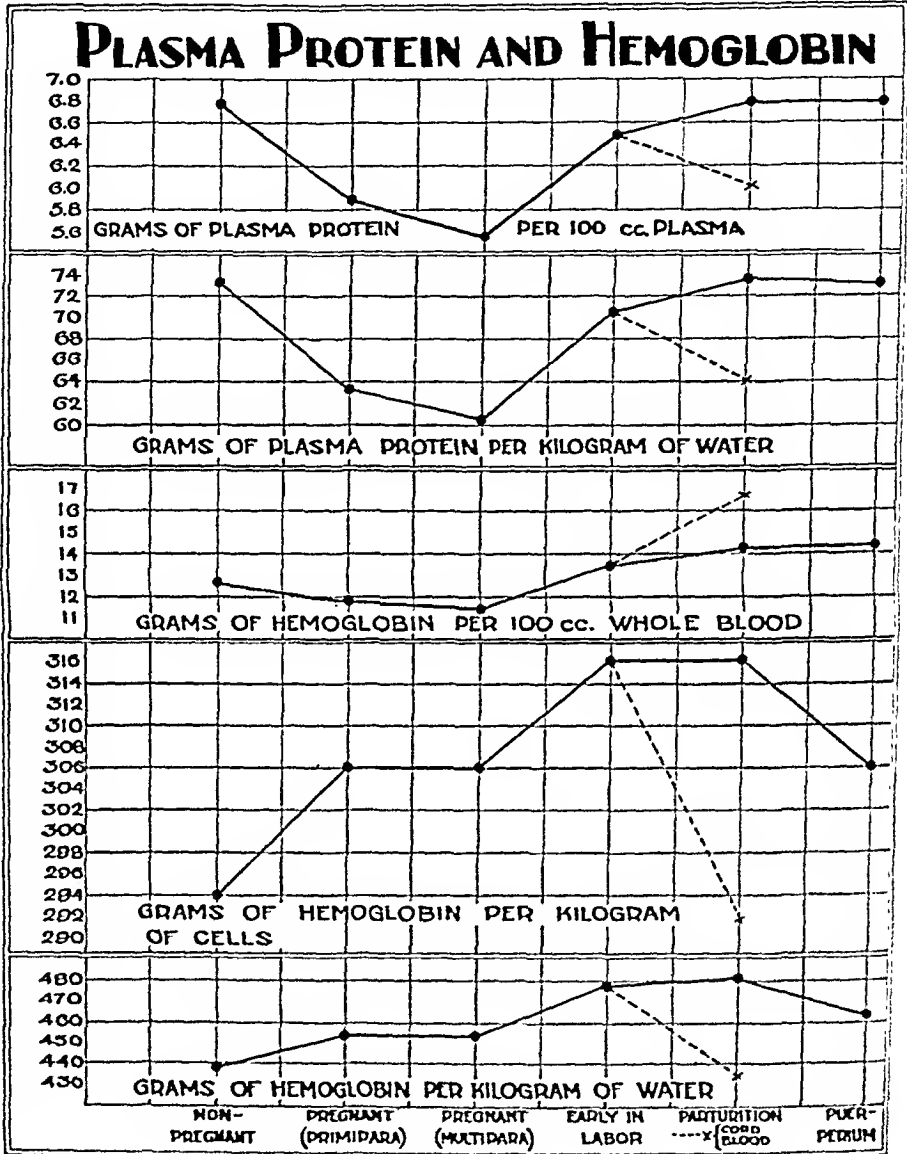


Chart 2.

$\left(\frac{\text{Water per Kg. of cells}}{\text{Water per Kg. of plasma}} \right)$ is quite constant, the average being 0.731 and the range 0.724 to 0.738. These alterations may be explained by dilution, and it would seem that variations in the water content of the plasma affect the suspended cells directly, since the distribution ratio remains so nearly constant.

Hemoglobin values for normal nonpregnant women are again slightly below the average determined by Osgood and Haskins¹⁹ on 100 normal women, namely 13.69 (10.98 to 16.49) gm. of hemoglobin per 100 c.c. blood. While our lower values (Table IV) may indicate a mild unrecognized anemia in certain members of the group, the discrepancy is not material. During pregnancy the hemoglobin percentage

falls considerably, to rise abruptly at labor and is at this new high point during the early part of the second week of the puerperium, while the hemoglobin per 1,000 gm. of cells increases as the hemoglobin of the whole blood falls. During labor both factors rise. In the second week following delivery the whole blood hemoglobin

TABLE III. WATER (IN GRAMS) PER KILOGRAM

	PLASMA	WHOLE BLOOD	RED BLOOD CELLS
Normal nonpregnant women	909 (895-922)	811 (799-828)	670 (657-679)
Late normal pregnancy, primigravidas	914 (907-920)	826 (806-845)	674 (651-684)
Late normal pregnancy, multigravidas	915 (908-922)	828 (819-839)	673 (662-688)
Early in labor	910 (903-914)	809 (798-823)	663 (658-682)
At delivery	906 (898-914)	798 (786-815)	656 (647-666)
Postpartum (7-9 days after delivery)	907 (899-916)	798 (769-813)	659 (645-679)
Umbilical cord blood	925 (912-928)	791 (766-812)	672 (664-684)

TABLE IV. HEMOGLOBIN

	GRAMS PER 100 C.C. WHOLE BLOOD	GRAMS PER 1000 GRAM CELLS	GRAMS PER 1000 GRAMS WATER
Normal nonpregnant	12.53 (10.83-14.32)	294 (285-310)	438 (399-468)
Late normal pregnancy, primigravidas	11.93 (9.25-14.02)	306 (287-337)	455 (426-498)
Late normal pregnancy, multigravidas	11.45 (10.37-12.90)	306 (252-349)	455 (416-549)
Early in labor	13.36 (11.92-14.94)	316 (290-338)	477 (441-510)
At delivery	14.10 (12.90-16.04)	316 (300-330)	481 (462-510)
Postpartum (7-9 days after delivery)	14.13 (12.35-17.01)	306 (288-352)	464 (425-546)
Umbilical cord blood	16.50 (15.30-18.88)	292 (260-331)	435 (388-498)

is still elevated although the concentration of hemoglobin in the cells has fallen below the pregnancy level. The curve of the hemoglobin per 1,000 gm. of water in the red cells follows that of the hemoglobin per unit mass of cells.

Plasma Proteins.—The concentration of plasma proteins varies directly with the plasma water content (Table V). During late pregnancy, there is a decreased protein concentration, but in the early part of labor the protein percentage is increased and rises still higher as delivery is approached. This curve is the reverse of that obtaining for the water content of the plasma, a fact which emphasizes the

direct relation which dilution has upon the protein concentration. The average values for grams of protein per 1,000 gm. of water in the plasma are roughly parallel to the plasma protein percentages, thus confirming still further the opinion that pregnancy is associated with plasma dilution. The protein content of cord blood is consistently lower than that of maternal blood.

TABLE V. PLASMA PROTEINS

	GRAMS PER 100 C.C.	GRAMS PER 1000 GRAMS OF WATER
Normal nonpregnant	6.77 (5.93-7.79)	73.4
Late normal pregnancy, primigravidas	5.89 (5.06-7.28)	63.5
Late normal pregnancy, multigravidas	5.61 (5.01-7.27)	60.4
Early in labor	6.51 (5.93-6.93)	70.4
At delivery	6.77 (6.41-7.09)	73.6
Postpartum (7-9 days after delivery)	6.73 (6.23-7.61)	72.9
Umbilical cord blood	6.00 (5.34-6.72)	63.9

DISCUSSION

The observations here recorded confirm existing evidence of consistent variations in the specific gravity and cell volume of the whole blood during pregnancy, labor and the early puerperium, and relate these changes more definitely to dilution by emphasizing the determined variations in water concentration of the various fractions of the blood.

The water concentration of the whole blood is significantly increased during gestation, but falls to a normal level as parturition is approached and drops below normal at the time of delivery. One week after delivery there is no demonstrable change from normal. The water concentrations in the plasma and cells follow a similar curve.

While these changes are producing a blood dilution, the constitution of the cells is being altered. The hemoglobin content of cells (grams per kilogram) is increased in the latter part of gestation and further increased during labor, when it is approximately 7 per cent higher than in nonpregnant women. After delivery there is a slight decrease. With the water concentration of the cells rising slightly during gestation, it may be assumed that the corresponding increase in hemoglobin represents an actual new production. The parturitional changes are evidently comparable to those which have been described by Dill, Talbott, and Edwards²⁵ as occurring during muscular activity, and are probably due to the dehydration which apparently affects all portions of the circulating blood. The ratio of distribution of water

between the cells and the plasma is remarkably constant but is lowered to a certain extent during labor, thus indicating a tendency toward the replacement of water taken from the plasma by that available in the cells. We have no adequate explanation for the observed lowering of cell specific gravity during labor, when the decrease in water and increase of hemoglobin in the cells would seemingly operate in the opposite direction, unless the leucocytosis commonly present at that time may be sufficient to produce the change, the white blood cells being considerably lighter than the red cells.

It is interesting that the hemoglobin content of the whole blood during the second week after delivery is the same as at the time of labor, in spite of the physiologic loss of blood during this interval. The water concentration of the whole blood and plasma does not change, but there is a slight rise in the cell volume and a decrease in the hemoglobin per kilogram of cells, which apparently are directly compensatory.

These observations present additional confirmation of the opinion that the mild gestational anemia consistently determined by clinical methods is more apparent than real, the entire phenomenon being dependent upon a marked dilution which affects both the plasma and the cells. It should also be pointed out that the subcutaneous edema present in the majority of pregnant women introduces an error into clinical determinations made upon finger-prick blood. Unpublished observations in this laboratory indicate that a very significant reduction of hemoglobin content and red cell count can be explained in this fashion.

SUMMARY

During the active childbearing function of women, the water concentrations of whole blood, plasma, and cells follow the same general curve, which is the reverse of that noted for specific gravity of whole blood and plasma, cell volume, plasma proteins, and hemoglobin content of whole blood. These findings confirm the conception of a blood dilution during pregnancy with prompt elimination of the excess water during parturition and the puerperium.

There is evidence that the body attempts to compensate for this dilution by increasing the hemoglobin content of individual cells, which consequently show an increased specific gravity.

The slight anemia of normally pregnant women recognized by clinical methods is only apparent and can be explained by physiologic dilution of the blood associated with an increased blood volume, and by the further dilution of finger-prick blood with the fluid from edematous subcutaneous tissues.

REFERENCES

- (1) Nasse, H.: Arch. f. Gynäk. 10: 315, 1876. (2) Jones, E. Lloyd: J. Physiol. 8: 1, 1887. (3) Zangemeister, W.: Ztschr. f. Geburtsh. u. Gynäk. 49: 92, 1903. (4) Polowe, David: AM. J. OBST. & GYNEC. 23: 843, 1932. (5) Plass, E. D., and Bogert, L. J.: Johns Hopkins Hosp. Bull. 35: 361, 1924. (6) Stander, H. J., and Tyler, M.: Surg. Gynec. Obst. 31: 276, 1920. (7) Schmidt, H. R., Bickenbach, W., and Jonen, P.: Ztschr. f. Geburtsh. u. Gynäk. 91: 555, 1927. (8) Kaboth, G.: Zentralbl. f. Gynäk. 47: 498, 1923. (9) Gueissaz, E., and Wanner, F.: Schweiz. med. Wehnschr. 3: 1173 and 1216, 1922. (10) Miller, J. R., Keith, N. M., and Rowntree, L. G.: J. A. M. A. 65: 779, 1915. (11) Stander, H. J., and Creadick, A. N.: Johns Hopkins Hosp. Bull. 35: 1, 1924. (12) Bohnen, P., and Borrmann, K.: Arch. f. Gynäk. 126: 144, 1925. (13) Dieckmann, W. J., and Wegner, C. R.: Arch. Int. Med. 53: 71, 1934. (14) Plass, E. D., and Rourke, M. D.: J. Clin. Investigation 5: 531, 1928. (15) Van Slyke, D. D., and Neill, J. M.: J. Biol. Chem. 61: 523, 1924. (16) Van Slyke, D. D.: J. Biol. Chem. 73: 121, 1927. (17) Hawk, P. B., and Bergeim, O.: Practical Physiological Chemistry, ed. 10, Philadelphia, 1931, P. Blakiston's Son and Co., p. 449. (18) Folin, O., and Wu, H.: J. Biol. Chem. 38: 81, 1919. (19) Osgood, E. E., and Haskins, H. D.: Arch. Int. Med. 39: 643, 1927. (20) Schmaltz, Richard: Deutsches Arch. f. klin. Med. 47: 145, 1891. (21) Leake, C. D., Kohl, M., and Stebbins, G.: Am. J. Physiol. 81: 493, 1927. (22) Polowe, David: J. Lab. & Clin. Med. 12: 1100, 1927. (23) Barbour, H. G., and Hamilton, W. F.: J. Biol. Chem. 69: 625, 1926. (24) Thompson, W. L.: Johns Hopkins Hosp. Bull. 15: 205, 1904. (25) Dill, D. B., Talbott, J. H., and Edwards, H. T.: J. Physiol. 69: 267, 1930.

PNEUMOCOCCUS PELVIC INFECTION IN WOMEN

PENDLETON TOMPKINS, M.D., PHILADELPHIA, PA.

(From the Gyneccean Hospital Institute of Gynecologic Research and the Department of Gynecology of the Hospital of the University of Pennsylvania.)

SINCE the publications of Michaut¹ and Jensen² thirty-five years ago, pediatricians and general surgeons have been familiar with the pneumococcus as a cause of peritonitis, but only recently has the attention of obstetricians and gynecologists been directed to this organism as a cause of puerperal infection and chronic pelvic inflammatory disease. King,³ who recently reported three cases of pneumococcus pelvic infection from his own experience and collected eleven cases from the literature, believes that pneumococcus infection is more frequent in obstetrics and gynecology than these few reports indicate. This seems probable, for at the Hospital of the University of Pennsylvania three cases of localized pneumococcus pelvic inflammatory disease were observed in the Department of Gynecology in the course of a single year. These three cases occurred among approximately 1,000 gynecologic patients who were admitted to the hospital between Sept. 1, 1933, and Sept. 1, 1934. No special search for pneumococci was being made at the time, and there was no unusual respiratory epidemic in progress. The report of these three cases is preceded by a discussion of pneumococcus pelvic infection, and by a tabulation of twenty-four similar reports found in a search of the literature.

TABLE I. PNEUMOCOCCUS INFECTION IN OBSTETRICS AND GYNECOLOGY. SUMMARY OF 24 CASES REPORTED IN THE LITERATURE

AUTHOR	REFERENCE	CLINICAL TYPE OF INFECTION	OUTCOME
Elkin	Arch. Surg. 18: 745, 1929	Peritonitis during pregnancy	Death
Hartemann and Lacourt	Bull. Soc. d'Obst. et de gynéc. 23: 451, 1934	Peritonitis during pregnancy	Death
Apert	Bull. et mém. Soc. méd. d. hôp. de Paris 54: 1877, 1930	Puerperal infection	Recovery
Baetjer	Trans. Assn. Am. Physiol. Philadelphia 40: 437, 1925	Puerperal infection	Recovery
Darré, Laederich, and Mamon	Bull. et mém. Soc. méd. d. hôp. de Paris 54: 1738, 1930	Puerperal infection	Recovery
de la Marnière	Bull. et mém. Soc. nat. de chir. 59: 7, 1933	Puerperal infection	Recovery
Seymour	Brit. M. J. 1: 895, 1928	Puerperal infection	Recovery
Armitage	Brit. M. J. 2: 1185, 1927	Puerperal infection	Death
Baetjer	Loc. cit.	Puerperal infection	Death
Laffont and Ezes	Bull. Soc. d'obst. et de gynéc. 21: 543, 1932	Puerperal infection	Death
McCord	AM. J. OBST. & GYNEC. 16: 272, 1928	Puerperal infection	Death
McCord	Loc. cit.	Puerperal infection	Death
Monekeberg	Gynéc. et obst. 6: 274, 1922	Puerperal infection	Death
Wetzel	München. med. Wchenschr. 62: 109, 1915	Puerperal infection	Death
Fricke	Ann. J. Surg. 8: 48, 1930	Postabortal infection	Recovery
Wolfsohn	Zentralbl. f. Chir. 57: 2842, 1930	Postabortal infection	Recovery
Wolfsohn	Loc. cit.	Postabortal infection	Death
Cole	Nelson's Loose-Leaf Living Medicine 1: 245, 1920	Pelvic abscess	Recovery
Von Rosthorn	Zentralbl. f. Gynäk. 18: 1150, 1894	Pelvic abscess	Recovery
King	AM. J. OBST. & GYNEC. 29: 341, 1935	Pelvic abscess	Recovery
King	Loc. cit.	Pelvic abscess	Recovery
King	Loc. cit.	Pelvic abscess	Not stated
Fricke	Loc. cit.	Pyosalpinx	Not stated
Zweifel	Arch. f. Gynäk. 39: 353, 1891	Pyosalpinx	Recovery

ETIOLOGY

Bacteriologic studies have shown that pneumococci may be recovered from the nasopharynx of almost all normal, healthy persons.^{4, 5} It, therefore, seems probable that the respiratory tract is the ultimate source of pneumococci which produce pelvic disease, but the route by which these organisms reach the peritoneal cavity is often a matter of conjecture. The two most likely possibilities are, first, metastatic infection through the blood or lymph from an active focus of pneumococci elsewhere, and second, ascending infection through the female genital tract. The introduction of pneumococci into the abdomi-

nal cavity by trauma is very rare. In animals it has not been possible to demonstrate conclusively that pneumococci can pass directly from the lumen of the intestine into the abdominal cavity, nor has it been possible to produce pneumococcus peritonitis by infection of the blood stream. However, from the clinical standpoint, secondary, or metastatic pneumococcus peritonitis does occur, as a complication not only of pneumonia, but also of other pneumococcus infections such as otitis media or mastoiditis. Many such cases are reported in the male where there is no possibility of ascending infection of the peritoneum.

After reading the publications of McCartney and Fraser^{6, 7} it is reasonable to believe that the pneumococcus can ascend through the female genital tract and cause peritonitis. This view is supported not only by experimental work but also by such clinical evidence as the following:

Monekeberg⁸ describes a patient who developed a puerperal infection three days after a normal delivery. The lochia showed a pure culture of pneumococci and the blood culture was positive for this organism. Autopsy showed pneumococcus endometritis, peritonitis, and pneumonia. No pneumococci had been found in the patient's sputum, but they were present in the sputum of the midwife in attendance.

Lambert⁹ reports an extraordinary sequence of cases. The young daughter of a man with pneumonia developed pneumococcus peritonitis. Later she developed pneumonia also. The nurse in attendance upon this girl developed pneumococcus peritonitis, and finally pneumonia.

Reports such as these, while not conclusive evidence of the path of infection, are significant. Generally speaking, unless there is a clear history to the contrary, obstetricians and gynecologists will not be far wrong in assuming that cases of pneumococcus pelvic disease which they see are the result of ascending infection. Pneumococcus peritonitis occurring as a complication of active pneumococcus infection elsewhere in the body is usually generalized, and is usually seen and treated by the general surgeon rather than by the gynecologist.

CLASSIFICATION

Intraabdominal pneumococcus infection may be classified according to the path of infection, the age distribution, or the clinical characteristics.

Since Michaut's description it has been customary to speak of primary and secondary pneumococcus peritonitis. McCartney rigidly defines primary infections as those in which no focus of pneumococcus infection can be demonstrated outside the abdomen. He thereby implies that primary pneumococcus peritonitis cannot be a metastatic, but must be an ascending infection, and that consequently it can occur only in the female. Nevertheless, so-called primary cases are reported in males. The authors of such reports usually state that

no extraabdominal pneumococcus infection was found. However, it is always possible that further search, including cultures of the mastoid cavities and the nasal sinuses, might have revealed a hidden focus of pneumococci. As might be expected, secondary pneumococcus peritonitis occurs with approximately equal frequency in both sexes. The primary or ascending infection is of chief interest to obstetricians and gynecologists.

In obstetrics and gynecology three varieties of pneumococcus infection may be seen: first, acute puerperal or postabortal pelvic infection; second, localized pelvic abscess; third, and least frequently because it is not strictly a gynecologic problem, generalized peritonitis.

INCIDENCE

The literature indicates that pneumococcus peritonitis is perhaps ten times as frequent in children as in adults and that girls are affected from three to seven times as frequently as boys. It has been estimated that 25 per cent or more of all generalized peritonitis in children is due to the pneumococcus.¹⁰ Much less frequently is it the cause of peritonitis in adults. Pflaum¹¹ determined the causative organism in ninety-seven fatal cases of peritonitis. Only two were due to the pneumococcus; one case followed pneumonia. Pneumonia is complicated by pneumococcus peritonitis in approximately 1 per cent of cases.^{12, 13}

Bacteriologic studies of fallopian tubes rarely reveal the pneumococcus,¹⁴ probably because it tends to produce a generalized peritonitis rather than to remain localized.

The incidence of pneumococcus infection in obstetrics and gynecology cannot be estimated from the data available. Inasmuch as there are no distinguishing clinical characteristics and diagnosis is entirely dependent upon bacteriologic study, it is probable that many cases escape recognition.

SIGNS AND SYMPTOMS

Neither pneumococcus puerperal infection nor localized pneumococcus pelvic inflammatory disease differs sufficiently from similar infections by other organisms to permit a bedside diagnosis. King stresses the importance of a history of recent respiratory infection and reports a case of pneumococcus pelvic infection correctly diagnosed from the history. The association should be kept in mind, but it would be rash to suspect every patient with pelvic inflammatory disease of having pneumococcus infection on the basis of a recent cold.

The signs and symptoms of pneumococcus peritonitis are occasionally sufficiently characteristic to permit a clinical diagnosis before bacteriologic studies have been reported. The disease usually begins

with a slight chill, sudden, severe, cramping lower abdominal pain, diarrhea (green stools), and vomiting. High fever (40° C.), high leucocytosis (30,000) with high polymorphonuclear count (95 per cent), and rapid pulse soon follow. Herpes labialis may be noted. Abdominal rigidity is often not marked. Abdominal distention and constipation appear and are frequently accompanied by bulging in the culdesac, for pneumococci rapidly produce large quantities of pus. Such pneumococcus infection will more often come to the attention of the general surgeon than of the gynecologist.

DIAGNOSIS

In its early stages primary pneumococcus peritonitis is likely to be mistaken for enteritis, salpingitis, or for some acute surgical condition such as appendicitis, pancreatitis, et cetera. Sympton describes a case mistaken for acute oophoritis because it developed during the course of mumps.¹⁵ Although laparotomy is no longer the treatment of choice, the fear of overlooking some operable condition leads most surgeons to operate even when the possibility of pneumococcus peritonitis is borne in mind. Material for bacteriologic examination may be secured by vaginal or abdominal puncture¹⁶ but is usually not available prior to laparotomy. Typical pneumococcus pus is profuse, thick, and odorless, and contains the organism in pure culture. In most cases the nature of the infection is realized before the results of blood culture can be reported, so this procedure is of confirmatory and prognostic rather than of diagnostic value. Bacteriologic examination of the lower genital tract may be helpful. Since the pneumococcus is almost never present in the normal vaginal discharges, its discovery in cervical or uterine secretions is of considerable significance. In all cases the diagnosis ultimately depends upon the bacteriologist; when pneumococci are found they should be typed in anticipation of the use of specific antipneumococcus serum.

PROGNOSIS

The prognosis of localized pneumococcus pelvic infections such as culdesac abscesses that can be drained, or tuboovarian abscesses that can be removed en masse, is good, but in other pneumococcus intra-abdominal infection the outlook is grave. Pneumonia, which is not an infrequent sequel, is more apt to develop if inhalation anesthesia has been administered.

TREATMENT

The present trend in the treatment of generalized pneumococcus peritonitis is away from laparotomy and toward conservative measures in hope that localization will occur. In actual practice, however,

since the diagnosis is usually not definitely established prior to operation, most patients are submitted to laparotomy and drainage.

A number of "specific" remedies have been suggested such as optochin, solutions of bile salts, autogenous vaccines, and antipneumococcus serum. Since no special treatment has been employed often enough to permit its evaluation, the management of pneumococcus pelvic infection, whether localized, puerperal, or postabortal, does not differ at present from that of similar infections of different etiology.

Antipneumococcus serum should have further trial not only because it may favorably affect the abdominal disease but also because it may decrease the patient's liability to pneumococcus pneumonia. It has been used for instillation into drainage tubes as well as for the usual intravenous injection. The type of serum used should match the type of pneumococcus found.

PROPHYLAXIS

Prophylaxis against ascending pneumococcus infection of the abdominal cavity consists in preventing pneumococcus infection of the lower genital tract. How such infection occurs can only be surmised. It is believed that scantily clad girls who sit in unclean places may be infected by direct contact, that pneumococci may be transferred from the respiratory passages by the hands, and that obstetric patients may be infected by respiratory droplets during labor and delivery. Condoms lubricated with saliva, a practice not uncommon among the lower classes, may also be a source of infection. Other possibilities suggest themselves.

It is remarkable that an organism such as the pneumococcus which is constantly found in the respiratory passages and which has an affinity for mucous surfaces should so seldom be found in the vagina. Perhaps, as the investigations of Schutt¹⁷ indicate, it is destroyed by the normal acid vaginal discharges. Schutt's studies may provide a clue to the susceptibility of children to ascending pneumococcus infection, since their vaginal discharges are less acid than those of the adult.

When a case of pneumococcus puerperal infection is recognized, an attempt should be made to discover its source. Cultures for pneumococci should be taken from the nasopharynx of the patient, and if these are negative, cultures should be taken from the attending staff. Investigations of this type, by disclosing the probable source of pneumococcus puerperal infection, will contribute to its prevention.

REPORT OF CASES

CASE 1.—*Pelvic abscess, pneumococcus Type I, colpotomy, recovery.* Mrs. M. P. (Gyn. No. 23390½), aged thirty-seven, married eighteen years, para vii, was admitted to the Hospital of the University of Pennsylvania on Dec. 26, 1933. Her remote

history included mumps in childhood and an appendectomy in 1913. The patient had never had pneumonia. Her last child was born in August, 1933; the delivery and puerperium had been uneventful. Menstruation had been normal prior to this pregnancy but had not occurred since. On December 13, four months after delivery, while in apparent good health, the patient had a sudden attack of cramping bilateral lower abdominal pain with nausea and vomiting. Shortly thereafter a watery mucoid diarrhea developed. Night sweats occurred and were accompanied by fever which on one occasion reached 102° F. The patient became rapidly weaker and stated that her weight had decreased from 115 pounds to 88 pounds in two weeks. Profuse leucorrhea developed. Two weeks after the onset of symptoms she entered the Gynecologic Ward. The patient denied any recent respiratory infection.

General physical examination was negative except that the patient was obviously in poor physical condition and had lost weight. The chest was clear. Pelvic examination revealed a cyst of the left vulvovaginal gland and a fluctuating adnexal mass pushing the uterus to the right. Diagnosis: left tuboovarian abscess.

Laboratory Report: 4.8 million erythrocytes and 12,800 leucocytes (90 per cent polymorphonuclears) per c. mm. of blood. Blood Wassermann and urinalysis negative. The erythrocyte sedimentation rate based on a normal settling of 23 mm. in two hours or more, was fast (thirty-five minutes).

On December 27 a colpotomy was performed by Dr. Charles Behney under local anesthesia. About 200 c.c. of thick pus was released and a drain was inserted. The pus showed a pure culture of Type I pneumococcus. Blood culture, taken Jan. 2, 1934, was negative. On January 3 the sedimentation rate was sixty minutes. The patient was discharged to a convalescent home on January 10, much improved.

Follow-up examination, January 24, showed continued improvement. The patient was last examined May 2, 1934. No adnexal masses were palpable. She had gained 20 pounds.

CASE 2.—Tuboovarian abscess, pneumococcus Type IV, laparotomy, recovery. Mrs. M. W. (Gyn. No. 23221), aged forty-two, married twenty-one years, completed a normal pregnancy and delivery in 1914. Gonorrheal infection in 1915 was followed by ankylosis of the right wrist. There were no subsequent pregnancies. In 1915 the cervix was amputated and a colporrhaphy was performed. Excepting for mumps in childhood the history was negative. The patient had never had pneumonia. On October 21, 1933, while in apparent good health, the patient developed bilateral lower abdominal pain and fever. There was no nausea, vomiting, or diarrhea. The patient was not prostrated, but continued to work as a clerk. On October 27, three days before the expected date, menstruation began with dysmenorrhea and passage of clots, symptoms never previously noted. A few days later thick leucorrhea appeared. This was accompanied by fever which at times reached 101° F. On Nov. 6, 1933, the patient entered the Gynecologic Ward. She denied any recent respiratory infection.

General physical examination was negative. The chest was clear. Pelvic examination revealed bilateral, fixed, tender adnexal masses which extended 6 cm. above the level of the symphysis. Diagnosis: pelvic inflammatory disease.

Laboratory Report: 3.8 million erythrocytes and 27,500 leucocytes per c. mm. of blood. Blood Wassermann and urinalysis negative. Sedimentation rate fifteen minutes (two hours taken as normal).

After two weeks of conservative treatment there was little improvement. On November 17 the sedimentation rate was seventeen minutes. On November 19 the patient returned home to continue conservative treatment. She improved gradually and resumed her work as a clerk. On Jan. 26, 1934, after recurrence of abdominal pain, the patient reentered the hospital. At this time the pelvic induration was

more localized, the leucocyte count was 15,500 per c. mm. of blood, and the sedimentation time was twenty-one minutes.

On January 27 a laparotomy was performed by Dr. Robert Kimbrough under nitrous oxide and ether anesthesia, and approximately one liter of green pus was evacuated from a right tuboovarian abscess. Drains were inserted and the abdomen was closed. Culture of the pus showed pneumococci, Type IV, and a few hemolytic streptococci. The patient's recovery was uneventful.

Follow-up examination in August, 1934, disclosed a right adnexal mass about 6 cm. in diameter. The patient was in good health, had no complaints, and had gained a few pounds. The sedimentation rate was still rapid (seventy minutes).

CASE 3.—Tuboovarian abscess, pneumococcus Type III, laparotomy, prolonged recovery. Mrs. R. D. (Gyn. No. 23332), aged thirty-three, married eighteen years, para ii, completed her last pregnancy in 1918. The puerperium was normal. She had had pneumonia in 1917 and a right salpingo-oophorectomy and appendectomy in 1925. No bacteriologic studies were made at the time of this operation. Her present illness began during 1932 with occasional dull pain in the left lower abdominal quadrant. In August, 1933, "inflammation of the bladder" developed with dysuria, urinary frequency, pain in the left lower quadrant and fever of 103° F. At this time profuse leucorrhea appeared. After two weeks in bed at home there was some improvement but the abdominal pain continued. The patient entered the Gynecologic Ward Dec. 5, 1933, complaining of pain in the left lower abdomen, leucorrhea, dysuria, and loss of 27 pounds in the preceding four months.

General physical examination was negative. The chest was clear. Pelvic examination revealed a tender nodular mass about 8 cm. in diameter adherent to and anterior to the retroflexed uterus. Diagnosis: pelvic inflammatory disease, possibly a tuboovarian abscess.

Laboratory Report: 4.4 million erythrocytes and 15,600 leucocytes per c. mm. of blood. Blood Wassermann and urinalysis negative. Sedimentation rate twenty-six minutes (two hours regarded as normal).

Conservative treatment was instituted, but after four weeks the patient made no improvement so, on Jan. 6, 1934, Dr. Floyd Keene performed a laparotomy which revealed a densely adherent left tuboovarian abscess. The patient's condition on the table was so poor that the difficult salpingo-oophorectomy was not attempted. Several ounces of thick, greenish pus were evacuated. Drains were inserted. Culture of the pus showed a pure growth of Type III pneumococci.

Recovery was slow. On Jan. 27, 1934, the patient left the hospital. Her wound continued to drain. She was examined every three months during the next year. During this time the draining sinus did not heal, nor did the pelvic mass decrease in size. The sedimentation rate remained rapid (thirty minutes).

The patient reentered the hospital Jan. 27, 1935, and 300 c.c. of serous fluid was removed by vaginal puncture. Culture of the pus from the abdominal sinus still showed pneumococci. Efforts to improve the patient's general condition were unsuccessful and she returned home.

At follow-up examination May 29, 1935, the sinus was still draining and the pelvic mass extended almost to the umbilicus. However, the patient had gained 20 pounds, had no pain, and felt much improved. The sedimentation rate was forty-five minutes.

SUMMARY

Pneumococcus pelvic infection has been presented as an unusual problem in obstetrics and gynecology. The incidence, origin, diag-

nosis, prognosis, and treatment of such infection have been discussed and measures for clinical study and for prophylaxis have been suggested. Twenty-four cases have been cited from the literature and three new cases have been reported in detail.

REFERENCES

- (1) Michaut: Contribution a l'étude de la peritonite a pneumocoques chez l'enfant, Thèse de Paris, 1901. (2) Jensen: Arch. f. klin. Chir. 69: 110, 1903. (3) King, J. E.: AM. J. OBST. & GYN. 29: 341, 1935. (4) Sutliff, W. D., and Steele, B. E.: Arch. Surg. 30: 14, 1935. (5) Thomson, David, and Thomson, Robert: Ann. Picket-Thomson Research Labs. 8: 1, 1932. (6) McCartney, J. E.: J. Path. & Bact. 26: 507, 1923. (7) McCartney, J. E., and Fraser, John: Brit. J. Surg. 9: 479, 1921-22. (8) Monckeberg, C.: Gynec. et obst. 6: 274, 1922. (9) Lambert, A. V. S.: Ann. Surg. 67: 263, 1918. (10) Meredith, E. W.: Pennsylvania M. J. 21: 556, 1918. (11) Pflaum, C. C.: J. Missouri M. A. 30: 72, 1933. (12) Sherrill, J. G.: Surgical Monographs, New York, 1925, D. Appleton and Co., p. 210. (13) Hertzler, A. E.: The Peritoneum, St. Louis, 1919, The C. V. Mosby Company, Vol. ii, p. 617. (14) Frank, R. T.: Gynecological and Obstetrical Pathology, New York, 1931, D. Appleton and Co., p. 321. (15) Sympton, N. S.: Indian Med. Gaz. 48: 107, 1913. (16) Neuhoof, H., and Cohen, I.: Ann. Surg. 83: 854, 1926. (17) Schutt, Anna: Zentralbl. f. Bakt. 131: 155, 1934.

A STUDY OF THE BLOOD LOSS IN THE THIRD STAGE OF LABOR AND THE FACTORS INVOLVED

JOHN B. PASTORE, M.D., NEW YORK, N. Y.

(From the Department of Obstetrics and Gynecology, Cornell University Medical College and the New York Hospital)

IN A RECENT issue of the AMERICAN JOURNAL OF OBSTETRICS AND GYNECOLOGY,¹⁰ I described a new method of measuring the blood loss during the third stage of labor. This method has been used routinely in the Woman's Clinic of the New York Hospital since September, 1934.

Shortly after the institution of this routine we were impressed by the increase in the incidence of postpartum hemorrhage. The question immediately arose as to whether it was due to mismanagement of the third stage or to the fact that the blood loss was measured. For this reason a study was made of the deliveries during September, 1933, and the corresponding month in 1934. The results are shown in Fig. 1 and Table I. All of the cases measured in the 1933 series were in the hemorrhage group.

TABLE I. COMPARISON OF MEASURED AND ESTIMATED BLOOD LOSSES

	CASES	MEASURED	ESTIMATED	AVERAGE BLOOD LOSS	HEMORRHAGES		
					CASES	PER CENT	AVERAGE BLOOD LOSS
September 1933	197	3.5%	96.5%	252.4 c.c.	7	3.55	1228 c.c.
September 1934	177	80.0	20.0	264.3 c.c.	16	9.05	806 c.c.

Over 67 per cent of the cases in the 1933 series were estimated in groups of 100 c.c. and 200 c.c. of blood loss. Although there is an increase in postpartum hemorrhage from 3.55 per cent to 9.05 per cent in the measured group, one notes an increase from 4.5 per cent to 19.2 per cent in the losses less than 100 c.c. The average blood loss in each series was practically the same. One can conclude, therefore, that there is a tendency to underestimate losses above 450 c.c. and to overestimate losses below 150 c.c.

The graph in Fig. 1 also shows the fallacy of trying to compare reports on postpartum hemorrhages, unless the percentage in each 100 c.c. blood loss group is given in addition to the average blood loss and the incidence of hemorrhage. In the 1933 series there were four cases

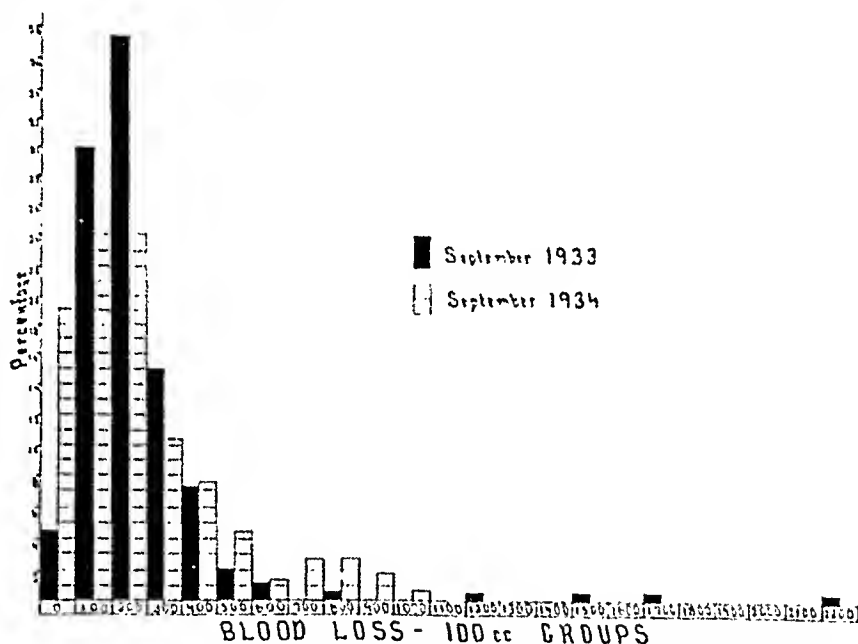


Fig. 1.—Comparison of estimated and measured blood losses. 1933 estimated; 1934 measured.

of hemorrhage of more than 1,000 c.c. in spite of the fact that the incidence was almost one-third of that in 1934. These patients were obviously in a more critical and serious condition than any of the patients in the 1934 series, whose maximum blood loss was in the 1,000 c.c. group. This statement is corroborated by the fact that the average blood loss in the hemorrhage group of each series was 1,228 c.c. in 1933 and 806 c.c. in 1934.

THE PRESENT STUDY

The present study includes 574 consecutive vaginal deliveries of full-term or premature babies. Of these cases 74 were either incompletely measured or estimated, as some of the deliveries were conducted on the Isolation Floor, and are, therefore, not included in the analytical study. The incidence of hemorrhage in this estimated

group was 5.4 per cent. At the present time it is possible to measure accurately over 95 per cent of the cases delivered. Most of the deliveries were conducted by the house staff or the fourth-year medical students. The more difficult operative procedures were carried out by the Resident on Obstetrics under the supervision of the attending staff, or by the attending surgeon. Both spontaneous and operative vaginal deliveries are included in the study.

In the 500 consecutive cases there were 32 cases in which the blood loss was 600 c.c. or more, giving an incidence of 6.4 per cent. There were no maternal mortalities. This is considerably less than the 13 per cent incidence reported by Williams in his series of 1,000 consecutive spontaneous deliveries. Polak in 1915 reported 1,306 consecutive home deliveries without a hemorrhage and 694 operative deliveries with

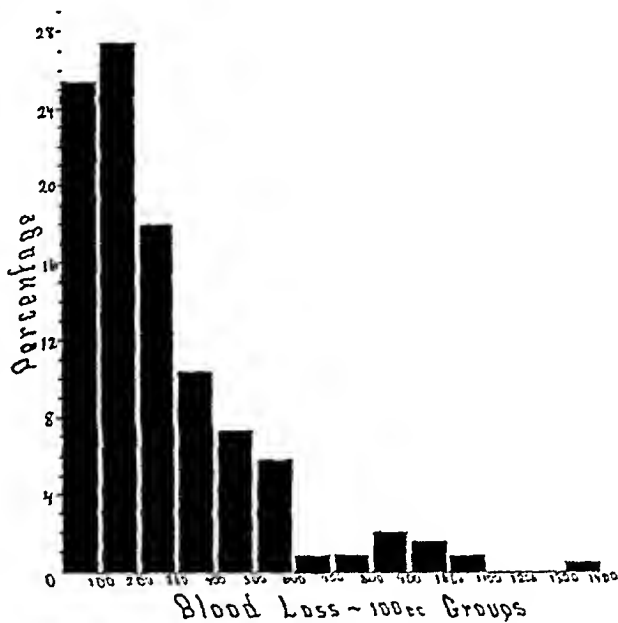


Fig. 2.—Distribution of blood losses in 100 c.c. groups: 0 to 99 c.c., 100 to 199 c.c., etc.

only three hemorrhages. Brandt in 1933 reported only 10 hemorrhages in 800 consecutive deliveries. Both of these reports are based on estimation of the blood loss in contrast to Williams' accurate measurements in his series. The largest series reported is that of Peckham and Kuder in a study of 19,200 consecutive deliveries at the Johns Hopkins Hospital. They found an incidence of 6.14 per cent but neglected to state the percentage of cases in which the blood loss was measured. Calkins reported in 1933 an incidence of 2.5 per cent in 800 cases. However, the blood loss in these cases is only partially measured by the Calkins technic.

The average blood loss in our series was 244.3 c.c. in contrast to Williams' 343.7 c.c. (measured), Ahlfeld's 505.1 c.c. (measured), Tucker's 300 c.c. (measured), Calkins' 222 c.c. and 179 c.c. (partially measured), and Brandt's 6½ ounces. It is difficult to compare these figures because of lack of standardization in the methods used. The difference in figures reported by Ahlfeld and Williams may be accounted for by their different method of management of the third stage. In our own series we have employed Calkins' modification of the Williams technic in determining the separation of the placenta.

In Fig. 2 the distribution of the blood loss is represented. Seventy and four-tenths per cent of the patients had a loss of less than 300 c.c. Calkins reported 89 per cent of

the losses to be less than 300 c.c. There were two patients who had losses in the 1,300 c.c. group. Since the opening of the Woman's Clinic in September, 1932, there have been eighteen patients in whom the blood loss was 1,500 c.c. or more, five of these occurring in 1934 prior to our present method of measuring the blood loss. The largest blood loss which we have had in approximately 1,400 deliveries since September, 1934, has been in the 1,300 c.c. group. This I think is due to the fact that with the use of the apparatus the operator is constantly aware of the blood loss and is therefore in a position to manage the third stage more efficiently. The incidence of shock has been markedly reduced during the past seven months, and we have had no patient who was thought to be in a critical condition because of the blood loss.

In 1919 Williams was impressed by the tolerance of recently delivered women to excessive blood loss. He offered as an explanation for

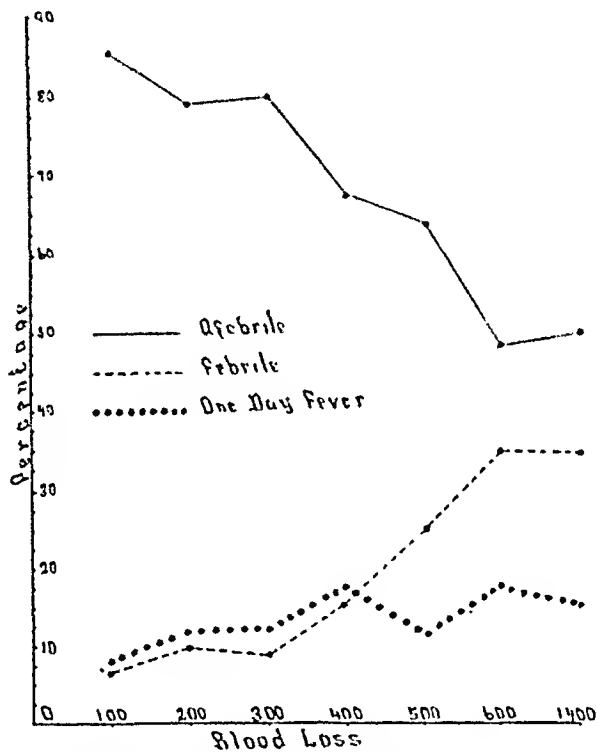


Fig. 3.—Puerperium in relation to blood loss. First group 0 to 99 c.c., second 100 to 199 c.c., etc. Last figure is for the hemorrhage group.

this the increase in blood volume and the development of some protective mechanism during pregnancy and labor. It seemed necessary, therefore, in this study to study not only the immediate reaction to hemorrhage but also the patient's course during the puerperium. Fig. 3 shows graphically the relation of the puerperium to the blood loss. There is a definite increase in morbidity with increase in blood loss. In our classification all patients who have a rise in temperature to 38° C. or more on two occasions for over twenty-four hours and excluding the first twenty-four hours after delivery are considered febrile. This increase is directly due to puerperal infection, since it accounted for 69.64 per cent of the febrile cases without hemorrhage,

and 90.90 per cent of those with hemorrhage. Obviously, although the recently delivered patient has tolerance to the immediate dangers of hemorrhage, yet her tolerance or resistance to infection is decreased. Fig. 4 shows that the average stay in the hospital after delivery increases with the blood loss. In both of these charts all the hemorrhages are grouped together in the last figure. Our attention, therefore, should be directed toward decreasing not only the incidence of hemorrhage but also the average blood loss, as pointed out by Calkins.

The various factors involved throughout pregnancy will be presented separately.

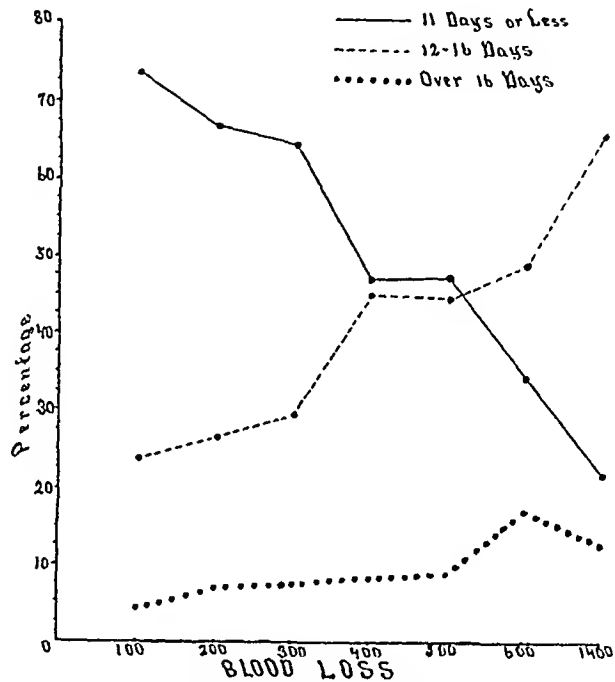


Fig. 4.—Postpartum days in hospital in relation to blood loss. Same scale as in Fig. 3.

Influence of the Age of the Patient.—Table II shows the incidence of hemorrhage and the average blood loss in four age groups. Contrary to the findings of Calkins and Peckham and Kuder, age seems to have a direct effect on the blood loss, as was first shown by Ahlfeld.

Race.—There were only twenty-six colored patients in our series so that no definite conclusions can be drawn. Of these 7.6 per cent had blood losses in excess of 600 c.c.

Complications of Pregnancy.—The thirteen cases of cardiac disease in this series showed a slight increase in blood loss, with an incidence of hemorrhage of 7.70 per cent and an average blood loss of 289 c.c. Some of this increase may be explained by the fact that the severe cardiacs receive drop ether anesthesia during the second stage of labor, and also the operative incidence is higher. Contrary to our expectations myomas of the uterus caused no appreciable increase. Only one of the sixteen patients had excessive blood loss, and this patient lost 900 c.c. The uterus was packed because of continued bleeding in spite of the fact that the uterus was firm. The average blood loss for the group was 256 c.c. No definite differentiation as to the type of the myoma could be made, and it is quite probable that in our series most of these were subserous.

No conclusion can be drawn from the cases of antepartum bleeding as the severe cases of separation of the placenta and the central placenta previas were treated by cesarean section. One of the cases was a central placenta previa and was treated by insertion of Voorhees' bag and subsequent version and extraction. The blood loss during both of these procedures was 1,200 c.c.

TABLE II. SHOWING RELATION OF BLOOD LOSS TO AGE OF PATIENT

AGE	CASES	HEMORRHAGES		AVERAGE BLOOD LOSS
		CASES	PER CENT	
Less than 20 years	33	0	0.00	183 c.c.
20-29 years	337	21	6.23	220 c.c.
30-34 years	79	6	7.60	266 c.c.
Over 34 years	51	5	9.80	279 c.c.

Of particular interest were the fifteen patients whose hemoglobin prior to delivery was less than 70 per cent. Four of these patients had blood losses of 600 c.c. or more, and the average blood loss was 456 c.c. This brings out the necessity of following closely the hemoglobin during the antepartum course. One determination at the time of registration is not enough, and at least one more reading should be obtained during the last month of pregnancy. Other obstetric and systemic complications showed no appreciable increase in blood loss.

Parity and Gravidity.—Table III discloses a marked increase in the blood loss in patients who have had two or more abortions. The incidence of hemorrhage in this group was 13.78 per cent with an average loss of 318 c.c. Parity seems to have very little effect, except in the primiparas, as the incidence of hemorrhage would be reduced to 4.34 per cent if the thirty-eight patients who had had previous abortions are excluded from the group.

TABLE III. SHOWING RELATION OF BLOOD LOSS TO PARITY AND PREVIOUS ABORTIONS

	CASES	HEMORRHAGES		AVERAGE BLOOD LOSS
		CASES	PER CENT	
Primipara	269	15	5.57	261 c.c.
Multipara	231	17	7.35	248 c.c.
Para i	128	11	8.59	264 c.c.
Para ii or more	103	6	5.82	228 c.c.
No previous abortions	404	24	5.94	251 c.c.
1 previous abortion	67	4	5.95	251 c.c.
2 or more abortions	29	4	13.78	318 c.c.

Toxemia of Pregnancy.—There were fifty-four cases of toxemia in this series, with three hemorrhages or an incidence of 5.55 per cent. The low reserve kidney group alone showed a slight increase to 8.59 per cent with an average loss of 253 c.c. The six cases of chronic nephritis showed an unusually low average loss of 150 c.c. The other forms of toxemia showed no effect on the blood loss.

Duration of Labor.—Although the total duration of labor has some slight effect on the blood loss, the more marked effects are obtained with prolongation of the second and third stage, as shown in Table IV. There is almost 40 per cent increase with second stage labor of over ninety minutes. Over 50 per cent increase is noted in third stage of over thirty minutes. No attempt was made in our series to study the effect of the intensity and frequency of the contractions as has been done recently by Calkins. However, it was noted that in thirty cases of contracted pelvis there were no hemorrhages and the average loss was 260 c.c. The various vertex presentations showed no appreciable difference in blood loss. The breeches, however,

showed an increase to 17.64 per cent, with an average loss of 291 c.c. It can be concluded, therefore, that whatever factors, other than contraction of the pelvis, are responsible for the prolongation of the second and third stage of labor are also responsible for the increased blood loss.

TABLE IV. SHOWING RELATION OF BLOOD LOSS TO THE DURATION OF LABOR

	CASES	HEMORRHAGES		AVERAGE BLOOD LOSS
		CASES	PER CENT	
<i>Total Duration:</i>				
3 hours or less	28	1	3.57	214 c.c.
3 to 10 hours	211	15	7.10	240 c.c.
10 to 30 hours	224	12	5.35	268 c.c.
Over 30 hours	37	4	10.81	269 c.c.
<i>Second Stage:</i>				
1½ hr. or less	404	23	5.69	239 c.c.
Over 1½ hr.	96	9	9.37	325 c.c.
<i>Third Stage:</i>				
Under 3 minutes	26	1	3.80	246 c.c.
3 to 30 minutes	440	24	5.45	245 c.c.
31 to 60 minutes	28	5	17.86	364 c.c.
Over 60 minutes	6	2	33.33	483 c.c.

Induction of Labor.—No direct effect was found in forty-five patients who had received medical induction. The average loss was 285 c.c. and the incidence of hemorrhage 4.44 per cent. Only one patient in this series had an operative induction so that no conclusions can be drawn.

Analgesia During Labor.—Considerable emphasis has been placed on analgesia and anesthesia as the cause of excessive blood loss during the third stage of labor. Recently Calkins has changed Kerr and Ferguson's statement to read, "We are absolutely satisfied that the two important causes of postpartum hemorrhage are faulty management of the third stage and large doses of anesthetic and sedative drugs." For this reason an analysis of the various medications was made and the results are presented in Table V. In dividing the cases into two groups, those with and those without analgesia, we find very little difference in the average blood loss or the incidence of hemorrhage. However, there are marked variations with the various forms of analgesia. It is significant, I think, that the highest incidence of hemorrhage and average blood loss was obtained in that group of patients who had received morphine and rectal ether. In fifty-six cases in this group hemorrhages were noted in 12.5 per cent of the patients and the average loss was 332 c.c. Even in those cases where rectal ether alone was administered the loss is greater than

TABLE V. SHOWING THE EFFECT OF ANALGESIA ON THE BLOOD LOSS

	CASES	HEMORRHAGES		AVERAGE BLOOD LOSS
		CASES	PER CENT	
Without analgesia	272	19	6.98	241 c.c.
With analgesia	228	13	5.70	272 c.c.
Morphine alone	31	1	3.22	261 c.c.
Morphine and scopolamine	22	0	0.00	213 c.c.
Rectal ether alone	69	4	5.79	271 c.c.
Morphine and rectal ether	56	7	12.50	332 c.c.
Morphine, scopolamine and rectal ether	41	1	2.44	247 c.c.
Nembutal alone	1	0	0.00	50 c.c.
Nembutal and others	2	0	0.00	225 c.c.

with other forms of therapy. However, when scopolamine is given prior to the administration of rectal ether the blood loss is markedly reduced. What rôle the scopolamine plays in the contraction of the uterus I am unable to state at this time, but that it does reduce the blood loss seems quite evident from this study. Recently, C. R. Tew, in a study of 400 cases of rectal ether analgesia in this clinic, reported no significant increase in the incidence of hemorrhage. This discrepancy can be explained on the basis of estimation of the blood loss, or to the routine use of scopolamine. At the time his study was conducted the blood loss was not measured. A series with paraldehyde analgesia is now being tried.

Anesthesia.—Table VI shows the effects of the various forms of anesthesia used during the second and third stages. Here again ether increases the blood loss. Ether anesthesia may also account for part of the loss occurring during repair of episiotomies and lacerations.

TABLE VI. SHOWING EFFECTS OF ANESTHESIA ON BLOOD LOSS

ANESTHESIA	CASES	HEMORRHAGES		AVERAGE BLOOD LOSS
		CASES	PER CENT	
None	4	0	0.00	125 c.c.
Nitrous oxide alone	308	14	4.54	232 c.c.
Nitrous oxide and ether	185	17	9.18	292 c.c.
Ether alone	3	1	33.33	483 c.c.

Rupture of the Membranes.—Ahlfeld and others repeatedly have stated that the time of rupture had no influence on the blood loss. In Table VII a study of the time of rupture in the 500 cases shows a direct effect on the blood loss. Premature rupture of the membranes increases the incidence of hemorrhage by over 50 per cent and the average loss by 30 per cent. In fact, it can be said that the later the rupture the less the bleeding. The cases with rupture during the first and second stages include both the spontaneous and the artificial ruptures.

TABLE VII. SHOWING RELATION OF BLOOD LOSS TO THE RUPTURE OF THE MEMBRANES

RUPTURE OF THE MEMBRANES	CASES	HEMORRHAGES		AVERAGE BLOOD LOSS
		CASES	PER CENT	
Second stage	234	11	4.70	236 c.c.
First stage	145	10	6.89	261 c.c.
Prematurely	90	9	10.00	299 c.c.
Unknown	31	2	6.43	243 c.c.

This study also offered the opportunity to evaluate the often quoted statement that premature rupture of the membranes increases the incidence of puerperal infection. In the 90 cases of premature rupture of the membranes there was an incidence of 14.44 per cent of febrile puerperium in contrast to 13.17 per cent in the 410 cases without premature rupture. This increase is within the expected limits, since we had a 50 per cent increase in hemorrhage and we know from Fig. 3 that 34.37 per cent of the hemorrhage group have a febrile puerperium. In addition the incidence of morbidity in the cases without hemorrhage is practically the same for both groups: 12.34 per cent with premature rupture, and 11.88 per cent without premature rupture. Also, the incidence of morbidity in the nine cases of hemorrhage with premature rupture was 44.44 per cent in contrast to 30.43 per cent in those without premature rupture. This too is a 50 per cent increase. It can be said: that premature rupture of the membranes definitely increases the blood loss by about 50 per cent; that with no excessive blood loss the incidence of infection is not

increased; and that with hemorrhage the incidence of morbidity is also increased by about 50 per cent. Can we assume then, that morbidity is directly proportional to the lowered resistance obtained with excessive blood loss?

Type of Delivery.—As shown in Table VIII, operative delivery is accompanied by increased blood loss during the third stage. The incidence of forceps delivery in the series was 10.2 per cent with an average loss of 405 c.c. and an incidence of hemorrhage of 11.76 per cent. The incidence of breech delivery was 3.4 per cent

TABLE VIII. SHOWING RELATION OF BLOOD LOSS TO TYPE OF DELIVERY

TYPE OF DELIVERY	CASES	HEMORRHAGES		AVERAGE BLOOD LOSS
		CASES	PER CENT	
Full term	488	32	6.55	257 c.c.
Premature	12	0	0.00	175 c.c.
Spontaneous	430	21	4.89	234 c.c.
Operative	70	11	15.71	385 c.c.

with an average loss of 291 c.c., and an incidence of hemorrhage of 17.64 per cent in the seventeen cases. The operative cases accounted for one-third of the hemorrhages. The indications for the operative procedures were studied and no definite effect could be found. There were only four midforceps and one high forceps in the series.

Presentation of the Placenta.—Schultze presentation of the placenta was encountered in 70.22 per cent of the cases with an average loss of 231 c.c. and an incidence of hemorrhage of 4.67 per cent. In 29.68 per cent of the cases the placenta presented by the Duncan mechanism with an average loss of 269 c.c. and 5.51 per cent hemorrhages. This does not include the thirteen cases in which manual removal of the placenta was carried out and in which the presentation of the placenta could not be differentiated.

The morbidity with manual removal of the placenta is presented in Table IX. The five patients without hemorrhage had an average loss of 390 c.c., and the

TABLE IX. SHOWING THE PUERPERIUM IN MANUAL REMOVAL OF THE PLACENTA

POSTPARTUM COURSE	WITHOUT HEMORRHAGE		WITH HEMORRHAGE	
	CASES	PER CENT	CASES	PER CENT
Afebrile	4	80.0	4	50.0
Febrile	1	20.0	3	37.5
One day fever	0	0.0	1	12.5

incidence of morbidity was no greater than in cases of spontaneous delivery of the placenta with the same blood loss. The incidence in the hemorrhage group is also within the expected limits. Our impression that manual removal of the placenta leads to puerperal infection is probably based on the fact that in the past it was resorted to only as a last procedure and the patient was already in critical condition. The series is too small to draw definite conclusions, but if these results are substantiated in future studies, it would justify the manual removal of the placenta in cases where postpartum hemorrhage seems inevitable.

Subinvolution of the Uterus.—Subinvolution occurred in 15.62 per cent of the cases with hemorrhage in contrast to 13.24 per cent of the cases without hemorrhage. The incidence is even higher in the hemorrhage group because these patients remained in the hospital longer and consequently their discharge examination was done later.

Weight and Length of Baby.—The relation of blood loss to the weight of the baby is shown in Table X. There is a progressive increase in the blood loss and incidence of hemorrhage with increase in weight, as was first shown by Ahlfeld. This has been ascribed to the overdistention of the uterus, but Ahlfeld suggested

TABLE X. SHOWING RELATION OF BLOOD LOSS TO THE WEIGHT OF THE BABY

WEIGHT OF BABY	CASES	HEMORRHAGES		AVERAGE BLOOD LOSS
		CASES	PER CENT	
Less than 2500 gm.	28	0	0.00	164 c.e.
2500-2999 gm.	88	3	3.40	198 c.e.
3000-3499 gm.	167	7	4.19	234 c.e.
3500-3999 gm.	156	15	9.61	285 c.e.
4000 gm. and over	61	7	11.47	359 c.e.

that in reality it was due to the large placentas associated with large babies. Our study of the weight and size of the placenta, however, did not bear this out.

The same tabulation was made for the length of the baby but this showed no correlation with the blood loss.

Lacerations of the Perineum and Cervix.—The study of the blood loss with lacerations, as revealed in Table XI, shows a marked increase with the extent of the laceration. In our series episiotomies bled about 100 c.e. more than the average for the 500 cases, or 150 c.e. more than those without lacerations. Recently Calkins stated that the average increase in blood loss with episiotomies was only about 60 c.e. and that it seldom offered a severe complication. To those of us who have used our present apparatus for measuring the blood loss, it has been obvious that there is considerably more bleeding with episiotomies and lacerations than we had formerly thought. With Calkins' method it is impossible to collect the blood during the repair and this undoubtedly accounts for some of the discrepancy. The anesthesia used during the repair contributes to some of the blood loss, and we have had several cases of hemorrhage in which the major part of the loss was due to the episiotomy.

TABLE XI. SHOWING THE EFFECTS OF LACERATIONS ON THE BLOOD LOSS

LACERATIONS	CASES	HEMORRHAGES		AVERAGE BLOOD LOSS
		CASES	PER CENT	
None	208	10	4.80	200 c.e.
First degree	107	3	2.80	231 c.e.
Second degree	53	3	5.66	316 c.e.
Episiotomy	131	16	12.21	351 c.e.
Third degree	1	0	0.00	450 c.e.
Cervical	3	2	66.66	783 c.e.

For that reason lacerations and episiotomies should be repaired immediately in those cases where there is active bleeding. The anesthesia of course will effect the third stage, and it would seem that in these cases pituitrin given before the delivery of the placenta would be justified, although this has not been our practice.

Weight of the Patient.—As shown in Table XII the weight of the patient has marked influence on the blood loss. There is some discrepancy in the first group, but this only includes 4 patients. The weight of the patient, as the hemoglobin prior to delivery, has great prognostic value. Obviously a patient of 90 kilograms will react far better to a loss of 1,000 c.e. than will one of 50 kilograms. This factor is too often neglected in the postpartum treatment of the patient.

Weight and Diameter of the Placenta.—Tabulation of the blood loss in relation to the weight and the mean diameter of the placenta showed no definite correlation, contrary to the findings of many observers. Apparently there was no relation be-

tween the weight of the placenta and the weight of the baby as the results should have agreed with those in Table X.

Twin Pregnancy.—In this series there was only one case of multiple pregnancy with a blood loss in the 500 c.c. group. No conclusions can be drawn from this, but earlier investigators have shown an increased blood loss.

TABLE XII. SHOWING RELATION OF BLOOD LOSS TO THE WEIGHT OF THE MOTHER

WEIGHT OF PATIENT	CASES	HEMORRHAGES		AVERAGE BLOOD LOSS
		CASES	PER CENT	
41 to 50 kg.	4	1	25.00	350 c.c.
51 to 60 kg.	85	1	1.17	183 c.c.
61 to 70 kg.	205	7	3.41	225 c.c.
71 to 80 kg.	130	13	10.00	311 c.c.
81 to 90 kg.	46	6	13.04	330 c.c.
91 to 100 kg.	13	2	15.38	335 c.c.
Over 100 kg.	12	2	16.66	315 c.c.
Unknown	5	0	0.00	150 c.c.

THE POSTPARTUM HEMORRHAGE GROUP

The various causes for the 32 cases of hemorrhage are indicated in Table XIII.

TABLE XIII. CAUSES OF POSTPARTUM HEMORRHAGE

	CASES	PER CENT
Hemorrhage with placenta, mismanagement	12	37.500
Incomplete separation	8	25.000
Uterine atony	3	9.375
Perineal lacerations, varicosities, episiotomies	3	9.375
Cervical lacerations	2	6.250
Prolapse of fundus into pelvis	2	6.250
Myoma uteri	1	3.125
Placenta previa	1	3.125
Total	32	100.000

In seven of the eight cases of incomplete separation of the placenta, manual removal was resorted to and the diagnosis confirmed. Most of the bleeding in these cases occurred before the removal of the placenta. It is interesting to note that in five of these cases the patients received nitrous oxide and ether for the repair of the episiotomies. In addition two of the five had breech extractions which also necessitated the use of ether. It seems plausible that ether should interfere with the normal contraction of the uterus and therefore may be responsible for the partial separation of the placenta. Obviously some of the placenta must be separated during the delivery of the baby as the uterus contracts to at least one-half its normal size at term. The degree of separation depends on the degree of contraction of the uterus which in turn is influenced by anesthesia. The average duration of the third stage in these eight cases was twenty-seven minutes. The same situation is present in those cases where just prior to delivery the fetal heart becomes irregular due to strong contractions of the uterus. The usual procedure is to administer ether anesthesia and to deliver the patient as soon as possible. Invariably the third stage in these cases is associated with a high incidence of incomplete separation of the placenta and excessive blood loss.

The three cases of uterine atony also had ether and nitrous oxide during the repair of episiotomies in two of them, and during the repair of a first degree laceration with ruptured varicosities in the third case.

In the group described as mismanagement are included all cases in which the major portion of the bleeding occurred with the expression of the placenta. This cause occurred more frequently during the early part of this study as most of the men were not familiar with Calkins' technic for determining the separation of the placenta. It is due to lack of recognition of the separation of the placenta and can be reduced by proper training.

Two of the hemorrhages were due to prolapse of the fundus deep into the pelvis. This type of bleeding can also be reduced by proper management of the third stage and will be discussed later in this paper.

Further study of the puerperium in the cases with excessive blood loss revealed that of the eleven patients with febrile course only three had hemoglobin determinations postpartum of 70 per cent or over. The highest determination was 72 per cent, and there were five patients with less than 60 per cent. In contrast to this only seven out of the sixteen patients with afebrile courses had hemoglobin determinations of less than 70 per cent. In the one day fever group of five cases three were below 70 per cent. There is a definite relationship between morbidity and the drop in hemoglobin after delivery. The drop in hemoglobin is dependent upon the blood loss and the weight of the patient. This exact coefficient cannot be determined from this study, but experiments are now being conducted to determine this factor. It will be of great value at the time of delivery to be able to compute the drop in hemoglobin and thus select the patients who should have transfusions.

THE MANAGEMENT OF THE THIRD STAGE

The proper management of the third stage is directly proportional to the individual's training and experience. The greater portion of hemorrhages in our service usually occurs during the first two weeks of service of each new interne. The junior internes have a greater incidence than the senior members in normal spontaneous deliveries.

Most observers are agreed that the views formerly held by Ahlfeld, Polak, and others are not tenable, and that the placenta should be expressed immediately after its separation as first advocated by Williams. The main difficulty, however, lies in the correct diagnosis of the separation of the placenta. The classical signs as given in the textbooks are present only after some time has elapsed after the separation.

Calkins in 1933, by a modification of the Williams technic, was able to reduce his average blood loss from 210 c.c. to 179 c.c. We have found this method of great value during this study, and it has proved that the duration of the third stage is much shorter than was formerly believed. This method, as stated in C. H. Davis' *Gynecology and Obstetrics*, places great emphasis on the change of shape of the uterus following delivery of the child. Immediately following the delivery of the baby, the uterus assumes a discoid or flattened shape. When the placenta is separated it assumes a globular shape and the placenta is expressed with the next contraction.

Of even greater importance in reducing the blood loss is the method of expression of the placenta. It has been shown repeatedly that there is increased bleeding following delivery of the placenta if the fundus is pushed deep into the pelvis. This is primarily due to partial obstruction of the venous drainage of the uterus as so often occurs in

retroversion of the uterus in the nonpregnant state. Most writers call attention to its significance following delivery of the placenta, but very little has been done toward its prevention. With the use of the Brandt maneuver its occurrence is greatly reduced, but it does not seem wise to attempt this maneuver without the diagnosis of separation of the placenta, as is recommended by the author. In addition it offers no protection against partial inversion of the uterus over the top and the posterior surface of the uterus. For that reason we have modified Calkins' technic as follows: Immediately following the delivery of the child, the right hand of the assistant is placed over the top of the fundus with the thumb over the anterior and the fingers over the posterior surface of the uterus. When the placenta is separated the fundus is gently massaged or, if there is no bleeding present, it is left alone until a contraction occurs spontaneously. At this time the left hand of the assistant is placed flat over the abdomen with the fingers directed under the symphysis. The fundus is then squeezed and pushed downward with the right hand. The left hand prevents the fundus from entering the pelvis. The placenta can be felt passing through the cervix and at this time the fundus is held up while the operator extracts the placenta from the vagina. There is no necessity for pushing the placenta out of the vagina at the expense of uterine trauma. If the placenta is not completely out of the cervix, the cord is held by the operator while the fundus is lifted up by the assistant. By the use of this method we have reduced the bleeding due to prolapse of the fundus into the vagina. The placenta should be expressed immediately after its separation and not after the conclusion of the repair of perineal lacerations or episiotomies.

Continued bleeding from the uterus prior to the delivery of the placenta is indicative of partial separation. This condition is brought about primarily by the use of anesthesia at the time of delivery and during repair of lacerations, or by the unwarranted attempts at expression of the placenta. Regardless of the cause, in the face of rapidly increasing blood loss as shown by the manometer, manual removal should be seriously considered. Manual removal of the placenta under ideal conditions offers the same prognosis as the blood loss associated with it.

Following delivery of the placenta continued bleeding from the vagina is due to four possible causes and each can be eliminated quickly, as follows:

1. *Uterine atony*, due either to lack of contraction or the presence of fibroids or retained placenta, particularly succenturiate lobes. The assistant is able to eliminate this cause instantly and the various forms of stimulations should be used. Intravenous pituitrin, $1\frac{1}{2}$ minims in 5 c.c. of saline, can be given safely if it is given slowly, and has never failed in this series to cause immediate contraction.

2. *Prolapse of the fundus into the vagina.* This should be eliminated by the proper management of the expression of the placenta. In all cases the fundus should be held out of the pelvis and such bleeding stops immediately. Occasionally, if the cervix is practically out of the vagina, it may be necessary for the operator to apply pressure on the cervix in order to raise it out of the pelvis.

3. *Perineal lacerations.* By inspection the source of the bleeding can be determined and proper measures instituted. Ruptured varicosities are better treated by packing than attempts at repair. Muscle sutures should be placed first in bleeding lacerations or episiotomies.

4. *Cervical lacerations.* This, of course, can be controlled only by proper sutures. However, I do not believe in the routine inspection of the cervix unless the above three causes have been ruled out. Only too often the bleeding is due to prolapse and this is accentuated by inspection of the cervix.

For teaching students this offers a rapid method for the proper diagnosis. In persistent atony of the uterus, packing should be resorted to. It was carried out in two cases in this series, one for placenta previa, and the other for myoma of the uterus. With the use of the Hohnes' packer infection is reduced to a minimum. The packing can be removed slowly in most cases within six to twelve hours, although there is no particular danger in leaving the packing in for twenty-four hours.

The usual treatment for shock should be employed when indicated. It should be remembered, however, that intravenous fluids, if used before the cause of the bleeding has been corrected, will cause additional bleeding and more profound and serious shock. Transfusions should be given immediately in cases of excessive blood loss. The usual tendency is to "wait and see what the hemoglobin does." However, at that time the patient usually has a fever and one hesitates to give a transfusion. Until we can predict the drop in hemoglobin post-partum, it will be difficult to say which case should have a transfusion. Supportive measures offer no immediate effects to maintain the patient's resistance against infection.

SUMMARY

A study of the third stage of labor in 574 consecutive vaginal deliveries is presented. Seventy-four cases were excluded because the blood loss was not completely measured. In the 500 cases studied, the blood loss was measured by the method recently described by the author. The various factors responsible for excessive blood loss have been presented. A study of the puerperium has also been made. Comparison of estimated and measured blood losses revealed that estimations are erroneous and misleading. The author's method of expression of the placenta is also presented. Further study of at least 2,000 more cases is necessary to substantiate the conclusions drawn from this study.

CONCLUSIONS

1. The incidence of postpartum hemorrhage was 6.4 per cent with an average blood loss of 244.3 c.c. There were 70.4 per cent of the patients who had a loss of less than 300 c.c.

2. The incidence of puerperal infection rises with increase in blood loss. The duration of stay in the hospital follows a similar curve.

3. Anemia predisposes to excessive blood loss. Patient's hemoglobin prior to delivery and the patient's weight have great prognostic value in the treatment of hemorrhage.

4. Previous abortions influence the blood loss during the third stage.

5. Premature rupture of the membranes increases the bleeding by about 50 per cent. The increase in morbidity with premature rupture of the membranes corresponds with the increase in blood loss.

6. Manual removal of the placenta predisposes to no more morbidity than is present with the associated blood loss.

7. Mismanagement of the third stage, partial separation of the placenta, and uterine atony were responsible for over 71 per cent of the hemorrhages. Anesthesia is partly responsible for the partial separation and the uterine atony.

8. The experience and ability of the operator and his assistants have a marked effect on the blood loss. The correct diagnosis of the separation of the placenta and the proper expression of the placenta will reduce the number of hemorrhages due to mismanagement of the third stage.

REFERENCES

- (1) *Ahlfeld, F.*: Ztschr. f. Geburtsh. u. Gynäk., p. 341, 1904. (2) *Brandt, M. L.*: AM. J. OBST. & GYNEC. 25: 662, 1933. (3) *Calkins, L. A.*: AM. J. OBST. & GYNEC. 17: 578, 1929. (4) *Calkins, L. A., Litzenberg, J. C., and Plass, E. D.*: AM. J. OBST. & GYNEC. 21: 175, 1931. (5) *Calkins, L. A.*: J. A. M. A. 101: 1128, 1933. (6) *Calkins, L. A.*: AM. J. OBST. & GYNEC. 29: 231, 1935. (7) *Curtis, A. H.*: Obstetrics and Gynecology, Philadelphia, 1933, W. B. Saunders Co. (8) *Davis, C. H.*: Gynecology and Obstetrics, 1933, Hagerstown, Md., W. F. Prior Co., Inc. (9) *DeLee, J. B.*: Principles and Practice of Obstetrics, ed. 6, Philadelphia, 1933, W. B. Saunders Co. (10) *Pastore, J. B.*: AM. J. OBST. & GYNEC. 29: 866, 1935. (11) *Peckham, C. H., and Kuder, K. K.*: AM. J. OBST. & GYNEC. 26: 361, 1933. (12) *Polak, J. C.*: Surg. Gynec. Obst. 21: 590, 1915. (13) *Tew, C. R.*: Am. J. Surg. 27: 289, 1935. (14) *Williams, J. W.*: Am. J. Obst. 80: 1, 1919. (15) *Williams, J. W.*: Obstetrics, ed. 6, New York, 1932, D. Appleton-Century Co.

NOTE: For the statistical study of these cases I am greatly indebted to Dr. Katherine K. Kuder and her assistant, Miss Ellen French.

THE TREATMENT OF PELVIC INFLAMMATION BY IONTOPHORESIS OF ACETYL-BETA- METHYLCHOLINE-CHLORIDE

ADOLPH JACOBY, M.D., F.A.C.S., NEW YORK, N. Y.

(From the Department of Gynecology, New York Post-Graduate Medical School and Hospital, Columbia University)

THE most important principle in the nonoperative treatment of pelvic inflammation is the induction of pelvic hyperemia. It is most easily accomplished by hot douches, taken properly. A modification of this therapeutic agent is applied in the Elliott treatment, in which the hot water is enclosed in a rubber bag in the vagina. The Elliott vaginal hot water bottle makes it possible to use higher degrees of temperature. Various external heating devices, such as electric light hoods, heat cabinets, and heat lamps have also been employed to initiate hyperemia. Diathermy has become a popular method of treatment, and is utilized to project heat between two electrodes, one in the vagina and the other on the abdomen. The radiotherm, or high-frequency fever producing machine, excites a general elevation of temperature and, with special technic, an incidental localized hyperemia.

Recently a group of drugs has been made available, each of which produces vasodilatation and thus induces hyperemia. Among such drugs are acetylcholine, histamine, and acetyl-beta-methylcholine-chloride.*¹ Of these acetyl-beta-methylcholine-chloride, the latest compound produced, seems to be the most effective.

Acetyl-beta-methylcholine-chloride when taken by mouth in doses of 100 to 200 mg., produces generalized flushing and sweating, increased salivation, a lowering of blood pressure, increase in pulse rate, intestinal peristalsis, and metabolism, which last from one-half to one hour.² Subcutaneously in doses of from 5 to 25 mg. the same effects are greatly increased and last from fifteen to twenty minutes except that the action on the gastrointestinal tract is not so pronounced.³

When applied locally by iontophoresis,⁴ there is some general reaction, but a much more pronounced effect at the site of application. This is particularly true in doses of 0.2 to 0.3 gm. When applied to the skin, the drug causes a rise in skin temperature for two to eight hours, marked sweating for four to ten hours, slight redness, a faster rate of capillary flow, and a slight increase in the white blood cell count. The marked vasodilatation is due chiefly to its effect on the arterioles.⁵

*The Acetyl-Beta-Methylcholine-Chloride (Meecholy1) was supplied by Merek & Co. Inc.

TABLE I. EFFECT AND DOSAGE OF VASODILATING DRUGS BY DIFFERENT METHODS OF ADMINISTRATION

DRUGS	ACETYL-BETA-METHYLCHOLINE	ACETYL CHOLINE
Oral	Mild general effect, lasts $\frac{1}{2}$ to 1 hour. Dose, 100 to 200 mg.	None
Subcutaneous	Powerful general effect, lasts 15 to 20 minutes. Dose, 5 to 25 mg.	Mild general effect, lasts 15 to 20 minutes. Dose, 100 to 200 mg.
Intravenous	Dangerous, toxic	
Iontophoresis	Pronounced general effect lasts 20 to 40 min. Pronounced local effect lasts 4 to 10 hours. Dose, 0.5 to 1 per cent solution	Mild general effect, lasts 10 to 20 minutes Mild local effect, lasts 1 to 2 hours. Dose, 0.5 to 1 per cent solution

TABLE II. COMPARATIVE PHYSIOLOGIC EFFECTS OF MECHOLYL AND HISTAMINE IONTOPHORESIS

	MECHOLYL ACTION MOSTLY ON ARTERIOLES	HISTAMINE ACTION MOSTLY ON CAPILLARIES
Topical effects	Increased skin temperature for 2 to 8 hours. Increased sweating for 4 to 10 hours. "Goose-flesh" lasting 10 to 20 minutes. Increased oscillographic reading. Faster capillary flow. Slight redness. Slight increase in local white blood cell count	Increased skin temperature for 2 to 4 hours. Enlarged capillaries. Increased capillary permeability. Wheal formation. Faster capillary flow. Definite redness
Systemic effects	Flush, sweating, increased salivation, lowered blood pressure, increased pulse rate, increased intestinal peristalsis, increased metabolism. Electrocardiogram: PR conduction time increased, T-wave increased amplitude, rate slower. Effects last 20 to 40 minutes	None

These physiologic effects have been utilized with considerable success in the treatment of spastic vascular conditions, endarteritis obliterans⁵ and infectious arthritis.⁴ The good results in such cases suggested the likelihood of effecting the same physiologic reactions to advantage in the pelvis, provided they could be induced by vaginal applications of the drug. To determine the possibilities involved in this theory, the treatment of various types of pelvic inflammation with acetyl-beta-methylcholine-chloride was attempted by introducing the drug through the vaginal vault by iontophoresis.

TECHNIC

With the patient in the lithotomy position, a bivalve speculum is inserted and the vaginal vault exposed. All excess of secretion is wiped away. Several thicknesses of gauze 6 inches square are soaked in 20 c.c. of a 1 per cent solution of acetyl-beta-methylcholine-chloride, prepared by dissolving 1 gm. of drug in 100 c.c.

of distilled water. This square of impregnated gauze is carefully spread out against the entire vault of the vagina. A thin vaginal electrode, with the active end wrapped in gauze and soaked in the 1 per cent choline solution is placed firmly against the gauze pack. The speculum is withdrawn leaving the electrode in place. This electrode is attached to the positive pole of a galvanic apparatus. A flat dispersive pad 6 by 8 inches, well moistened in warm water, is placed on the lower abdomen and connected to the negative pole. To insure an even contact, a sand-

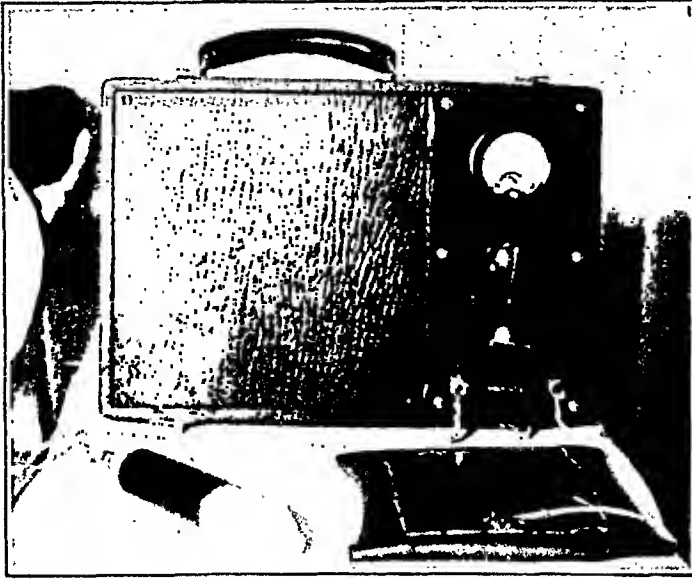


Fig. 1.—Galvanic machine. Vaginal electrode wrapped with gauze. Flat abdominal electrode.

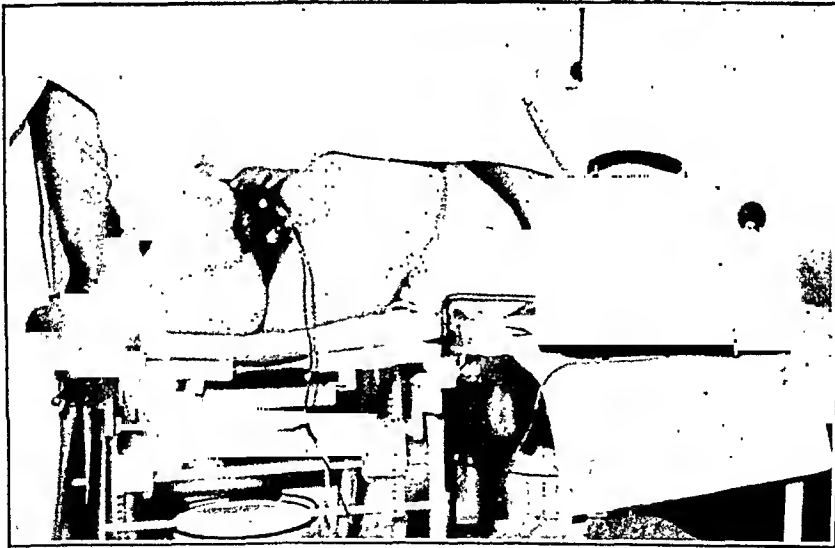


Fig. 2.—Technic of application. Vaginal electrode to the positive pole and abdominal electrode to the negative pole.

bag is placed over the negative pad and the patient is directed to press it firmly against the skin. The current is turned on gradually until 15 or 20 milliamperes are used, and allowed to flow for twenty to thirty minutes. The current is then slowly shut off and the electrode and vaginal gauze removed. The amount of acetyl-beta-methylcholine-chloride thus introduced has been found to be 31 per cent, or 62 mg. Allowing for the small quantity which adheres to the vaginal wall, this corresponds closely with the estimated amount of 24 per cent or 48 mg., which should

theoretically be introduced by this technic. No douches are prescribed at any time. The treatment is repeated every other day. No local reaction is noticed by the patient, but there is usually a generalized sweating, flushing, and sense of warmth, with marked salivation during the treatment. In some instances there is an initial drop of blood pressure. When the general reaction is too pronounced, the application is interrupted, and 1/150 gr. atropine sulphate is given hypodermically. This acts as a physiologic antidote and immediately counteracts all untoward symptoms.

A brief transcript of the results obtained in the first ten patients treated is appended herewith.

CASE 1.—(A61574) P. C., married nine years, 2 children, youngest three years old, no miscarriages, menstruation regular, six or seven days, moderate amount accompanied by pain. Complained of pain in left upper and lower abdominal quadrants, four to five months' painful menstruation. Vagina relaxed. Cervix lacerated. Uterus normal. Right adnexa negative. Left tube and ovary enlarged and tender. Parametrium posteriorly thickened. Cervicitis, left salpingo-oophoritis, posterior parametritis. She had eleven treatments from Dec. 5, 1933 to Jan. 6, 1934. On Jan. 19, 1934, cervix smooth. Uterus negative. Adnexa negative. Parametrium soft, not sensitive. Menstruation painless. On June 14, 1934, pelvic examination was negative. Still complained of upper abdominal pain. Referred to Gastro-Intestinal Department.

Comment: This patient had a subacute pelvic inflammation. Treatment afforded complete relief of pain during menstruation and disappearance of the inflammatory exudate after thirty-two days. Upper abdominal symptoms persisted.

CASE 2.—(A58588) M.F., thirty-three years old, married fourteen years, no children, no miscarriages, menstruation regular, three to four days, moderate amount, painful. Pain in lower abdomen for fourteen years, more severe during menses. Moderate discharge. June 22, 1933, vagina negative. Cervix slight erosion. Slight discharge. Few cysts. Aug. 26, 1933, endocervix removed by conization. Three weeks later the right tube and ovary was enlarged and adherent, extending to pelvic wall and posterior surface of uterus. Chilliness and fever. Dec. 9, 1933, the mass continued its extension behind the uterus and to the left border of the pelvis. Parametrium thick and tender.

Diagnosis: Bilateral salpingo-oophoritis, parametritis. She received 7 treatments starting Dec. 12, 1933, and ending Jan. 6, 1934.

On Jan. 6, 1934, right adnexa negative. Ovary palpable. Left tube negative. Left ovary slightly enlarged. Exudate entirely disappeared. The same findings were present on reexamination March 3, 1934, and June 16, 1934.

Comment: This patient had an adnexal inflammatory flare-up following cervical conization. Completely cured in twenty-five days.

CASE 3.—(S0477) A. N., thirty-five years of age, married seventeen years, 2 children, youngest two years old, no miscarriages, menstruation regular, four days, moderate, no pain. Discharge yellow and white, one year. July 19, 1933, vagina relaxed. Cervix redlined and lacerated. Uterus anterior. Adnexa negative. Endocervicitis. Nov. 16, 1933, endocervix removed by conization, and later several nabothian cysts were destroyed by cautery. She developed increasing pain in left lower abdominal quadrant during the past ten weeks. Feb. 24, 1934, uterus anterior, close behind symphysis, normal size, pushed to the right. To the left of the uterus is a large mass filling the entire pelvis rising above the uterine fundus, extending backward behind the uterus and toward the right. Feels cystic, fixed, and tender. *Diagnosis:* Probable tuboovarian inflammation (possible ovarian cyst). She received 9 treatments from Feb. 27, 1934, to March 22, 1934. After two treatments mass

one-fourth its original size. On March 24, 1934, uterus freely movable, normal size and position. Right tube and ovary negative. Left tube negative. Left ovary palpable, prolapsed, not sensitive, freely movable. Reexamination on May 19, 1934, was entirely negative.

Comment: This patient had an adnexal flare-up following cervical conization and cauterization of cysts. Exudate disappeared entirely in twenty-three days.

CASE 4.—(A77218) H. M., thirty-seven years of age, married twelve years, widow five years, one child sixteen years old, no miscarriages, menses regular, four days, painful. Moderate yellow discharge for five years. Pain in the back and right lower quadrant for sixteen years. Vagina relaxed. Cervix lacerated, moderate purulent discharge. Uterus negative. Adnexa negative. Diagnosis: Cervicitis. On March 1, 1934, cervix was coagulated. Three weeks later she had severe pain in lower abdomen, chills, and fever. Cervix: slight slough in external os. Uterus slightly enlarged. Adnexa on both sides enlarged, extending to the pelvic walls and adherent. Parametrium densely infiltrated. Diagnosis: Bilateral salpingo-oophoritis, pelvic cellulitis. Temperature 102.2° F. by mouth. Pulse 104. Blood count 3,830,000 red blood corpuscles. Hemoglobin 84 per cent. White blood corpuscles 38,000. Polynuclear leucocytes 89 per cent. March 27, 1934, admitted to hospital. Ran an elevated temperature for six days, highest 104° F. On seventh day temperature was 99.6° F. and normal thereafter. In the hospital for fifteen days. She had 5 treatments. In addition, had ice bag to the lower abdomen, on two hours and off two hours, and hot saline douches. She was discharged from hospital on April 7. Examination on that day showed cervix smooth, and uterus anterior, tilted to the left. Left tube and ovary negative. Right tube very slightly thickened. No adhesions. No tenderness. Parametrium free of all exudate.

Comment: This patient had an acute pelvic inflammatory reaction following coagulation of cervix. Exudate disappeared entirely after treatment for fifteen days.

CASE 5.—(A77724) C. T., twenty-two years of age, married, no children; menses regular, two days, moderate, no pain. Pain in left lower quadrant, 5 days, moderate yellow discharge two weeks, backache. External genitals irritated. Vagina irritated. Cervix small. Uterus close under the symphysis. Right tube and ovary slightly thickened and sensitive. Left tube and ovary markedly enlarged, filled the entire left pelvis, about four inches in diameter, extended behind the uterus, irregular in outline, somewhat soft, immobile, and tender. Parametrium thickened and sensitive posteriorly. Bilateral salpingo-oophoritis. Probable left pyosalpinx. She received 8 treatments from Feb. 3 to March 6, 1934. After three treatments mass on left side one-third original size. Fornices free. No fluctuation. Adnexal structures becoming isolated. On March 6, 1934, slight thickening in right fornix. Pelvis otherwise negative. On March 15 uterus small, normal position, freely movable. Adnexa negative. No exudate or thickening in the pelvis.

Comment: This patient had an acute bilateral pelvic adnexal inflammation, probably of specific origin, with pus in the left tube. The exudate entirely disappeared after treatment for thirty-one days.

CASE 6.—(A71352) F. S., twenty-three years of age, married six years, one child three years ago, died at birth; two miscarriages, menstruation one day, slight amount, painful. Profuse mucopurulent discharge. Sharp pain in right lower quadrant for two weeks. Frequent urination day and night. Cervix reddened, profuse discharge. Uterus anterior. Adnexal mass filling right fornix, tender, thickened about three inches in diameter. Left tube thickened and tender. Parametrium thickened. Cervicitis, bilateral salpingo-oophoritis, parametritis. She had 6 treatments from Jan. 18 to Feb. 15, 1934. Feb. 1, 1934, had two treatments.

Menstruated on January 22 for two days, stopped for two days, started again January 27 to 31. Had severe backache. Examination showed adnexal masses diminishing in size. Cervical discharge diminished. Treatment resumed. On February 15, tubes not palpated on either side. Apparently normal. Right ovary slightly enlarged. Left ovary normal. Uterus freely movable, no pain, no tenderness. Patient apparently well. On February 24, menstruated for two days. Some pain in lower abdomen. Examination entirely negative. On March 10, menstruated four days, no pain. Examination negative. Reexamination, June 5, negative.

Comment: This patient had a subacute bilateral pelvic inflammation, probably specific. The exudate cleared up entirely after twenty-eight days' treatment.

CASE 7.—(A82503) F. C., forty-one years of age, married twenty-four years, one child twenty years old, 5 miscarriages, last one twenty-one years ago, menstruation irregular and profuse. Pain in left lower quadrant six years ago. Pain in both lower quadrants for two months. Backache. Moderate yellow discharge for two weeks. April 5, 1934, cervix smooth, several nabothian follicle cysts. Uterus anterior, slightly enlarged, slightly irregular, limited mobility, sensitive. Adnexa right side, enlarged, adherent to posterior broad ligament, dropped into culdesac and adherent to floor of pelvis. Left side, enlarged, extends laterally for some distance and adherent to posterior broad ligament. About four inches in diameter. Parametrium markedly infiltrated posteriorly. Diagnosis: Bilateral salpingo-oophoritis, pelvic cellulitis. She had 7 treatments from April 14 to May 1, 1934. April 21, sweating, flushing, salivation, slight fall in blood pressure during treatment. Adnexal and parametrial exudate almost completely dissipated. On May 1 tubes and ovaries and parametrium entirely negative. June 21, no treatment for seven weeks. No complaints. Cervix smooth, few nabothian follicle cysts, no discharge. Uterus tipped to the right and drawn back. Right ovary small and palpable. Right tube negative. Left tube and ovary negative.

Comment: This patient had an exacerbation of a previous tubal inflammation. The exudate entirely disappeared after sixteen days of treatment.

CASE 8.—(A84274) G. H., twenty-one years of age, married two years, no children, one abortion induced four years ago followed by fever, menstruation regular, one week profuse, painful. Moderate yellow discharge and pain in the lower abdomen for one year. Cervix small. Uterus anterior and small, fixed, drawn back into the hollow of the sacrum. Adnexa, right tube thickened, right ovary palpable, prolapsed. Left tube markedly enlarged. Left ovary large. Parametrium thickened posteriorly and laterally. Bilateral salpingo-oophoritis, parametritis. She had 14 treatments from May 12 to June 23, 1934. After the seventh treatment the tubal involvement practically disappeared. Both ovaries palpable. Had an exacerbation lasting two days following swimming. June 23, 1934, right tube negative. Right ovary palpable. Left tube negative. Left ovary enlarged, irregular, small cystic degeneration.

Comment: This patient had an exacerbation of a preexisting infection. The inflammatory exudate disappeared in nineteen days. Treatment was continued for twenty-three days without additional effect on the ovarian enlargement.

CASE 9.—(A83929) C. M., forty-five years of age, married twenty years, 5 children, youngest seven years old, two miscarriages, last one five years ago, menstruation regular, one week, profuse. Pain in lower abdomen seven months. Vagina relaxed. Cervix hard. Uterus not distinctly outlined, incorporated with masses on either side. Right side filled with a mass extending to the pelvic wall about five inches in diameter. Firm and immobile. Left side smaller mass somewhat softer in consistency, tender. Tuboovarian inflammation. She had 8 treatments from April 17

days, according to individual needs, was often enough. All examinations were done during the intermenstrual period by the authors, with the patient in the lithotomy position. It was regarded as unlikely that the uterus could displace intestines sufficiently rapidly to alter its position during the few moments necessary to conclude an examination. This belief seems to be confirmed by the present findings.

RESULTS

Thirteen, or 65 per cent, of the 20 women were found to have retroverted uteri at the first examination (Table I). All except one of these had either lain on her back habitually or had done so for several days preceding examination. Of the seven whose uteri were originally anteverted, four lay habitually on side and/or abdomen, and two were permitted to be out of bed part of the time.

The position of the uterus changed at least once in 18 of the 20 subjects (90 per cent), and four times in 16 (80 per cent). It did not change during the period of observation in two patients (Nos. 19 and 20), although they cooperated and were afforded as much opportunity as any of the others for a change to occur.

The maximum and minimum intervals, 267 and 25 hours, respectively, between observed changes in uterine position are recorded in Table II. The longest time spent in any designated posture was 151 hours, the shortest, 20 hours. Many patients were examined two, and even three, times during maintenance of a given posture before change in uterine position was noted. Hence, although the actual length of time necessary to effect a change in uterine position is not known, it is probably a matter of days rather than hours.

TABLE II. LAPSE OF TIME BETWEEN CHANGES IN UTERINE POSITION IN HOURS

Note that the lapse of time necessary for any change in uterine position to take place is a question of days instead of hours.

DIRECTION OF CHANGE IN UTERINE POSITION	MAXIMUM		MINIMUM	
	TIME SPENT IN DESIGNATED POSITION	ELAPSED TIME BETWEEN EXAMINATIONS	TIME SPENT IN DESIGNATED POSITION	ELAPSED TIME BETWEEN EXAMINATIONS
Anterior to posterior	143	267	20	25
Posterior to anterior	151	218	24	48

DISCUSSION

Inasmuch as it is scarcely conceivable that pulmonary tuberculosis can influence the position of the uterus in a woman whose pelvic and abdominal viscera are normal, it becomes necessary to invoke some other explanation for the retroversion found in 13 of the 20 patients in our series. The data presented herewith indicate that posture in bed was the principal determining factor in 90 per cent of our 20 subjects. Its influence was especially pronounced in the 16 patients in whom the uterus responded obediently to four changes of posture. Why posture had no effect in two patients is not clear.

The time which was required for the uterus to change its position is of interest in view of the frequency with which patients are told that a fall or other sudden trauma probably caused a retroversion. No change in uterine position occurred in less than twenty hours, and in one patient, who was being examined frequently, one hundred fifty-one

UNIVERSITY OF WASHINGTON
SCHOOL OF NURSING
HARBORVIEW DIVISION.

100

AMERICAN JOURNAL OF OBSTETRICS AND GYNECOLOGY

complained of pains elsewhere. This constituted an uncertain clinical picture.

The next five patients had huge inflammatory exudates in the cellular tissues and tubes. The rapidity with which the exudates disappeared under treatment was astonishing and justified its continuation.

In the seventh patient the first indication of limitation of effect was noted. There was an old cervicitis with many nabothian follicle cysts, in addition to the acute flare-up in the cellular tissue and tubes. Two months after the complete disappearance of the pelvic exudate, the nabothian cysts were still unaffected.

The eighth patient added another condition which was not influenced by the treatment. After the disappearance of the tubal and parametrial exudate, the left ovary, which had become distinctly palpable, enlarged, and presented small cystic degeneration, failed to diminish in size. After several additional treatments had been given, it was apparent that no change would occur, so treatment was discontinued.

In the ninth patient, the first positive evidence of the limitation of effect was obtained. Treatment was begun for what was thought to be a pelvic inflammation. After several treatments, with practically no change in the size of masses, but with more discrete delineation, it was believed that the mass at least on one side was cystic. At operation, both lateral enlargements proved to be ovarian cysts.

The pathologic condition in the tenth patient was similar to that in the previous one. This patient was given additional treatment to see what effect, if any, repeated applications would have. Practically no change in the pelvic condition was observed.

Of the ten patients treated by the iontophoresis of acetyl-beta-methylcholine-chloride, seven, with extensive pelvic inflammation, were completely cured. In several, concomitant painful menstruation was relieved. No effect was produced on nabothian follicle cysts, small cystic degeneration of the ovaries, or large ovarian cysts. Further investigations to more completely define the uses and limitations of this treatment are in progress. So far as one can judge from a small number of cases, it is likely that this method of treatment is an effective agent in promoting the rapid absorption of inflammatory pelvic exudates, with incidental relief of symptoms. It produces no change in productive pathologic conditions. It seems to be superior in its effects to other methods of exciting pelvic hyperemia because it has a much more sustained physiologic action.

REFERENCES

- (1) Major, E. T., and Cline, J. K.: *J. Am. Chem. Soc.* 54: 242, 1932. (2) Starr, I., Jr., Elsom, K. A., and Reisinger, J. A.: *Am. J. M. Sc.* 3: 186, 1933. (3) Abbott, H. O.: *Am. J. M. Sc.* 3: 186, 1933. (4) Kovacs, J.: *Am. J. M. Sc.* 1: 188, 1931. (5) Comroe, J. H., Jr., and Starr, I., Jr.: *J. Pharmacol. & Exper. Therap.* 3: 49, 1933. (6) Starr, I., Jr.: *Am. J. M. Sc.* 3: 186, 1933.

hours were required. If the action of gravity is assumed to play an important rôle in influencing uterine position, it is necessary to explain why its action is so slow. The difference in the relative specific gravities of uterus and intestines is probably not large, so that the *effective weight* of the uterus is much less than the actual weight of the organ when removed from the body. Furthermore, when the uterus is anteverted and intestines are packed behind it in the true pelvis, many hours, or even days, must elapse before the relatively small effective uterine weight can displace the loops of bowel, even though uterine movement may be aided by intestinal peristalsis. In our experiments, when no change occurred within twenty-four hours, it was observed that maintenance of the same posture for an additional twenty-four hours would often bring about the desired change. Therefore, it must be impossible for the uterus to become retroverted in the few minutes which it takes for a patient who has been maintaining the prone position to turn over on her back for pelvic examination. If it be true that change in uterine position occurs only during the lapse of days, instead of hours or minutes, our present conception of the effect of knee-chest postures and postural exercises upon uterine position must be revised. Schauffler¹ compared the results of practicing postural exercises with the results of neglect, six weeks after parturition, in each of two series of 84 and 85 patients, and found that the incidence of postpartum retroversion was considerably higher among the women who had practiced exercises than among the controls. This tends to confirm our suspicion that the few minutes a woman spends in supposedly corrective exercises or postures have no effect whatsoever on the position of the uterus. Our experimental data indicate that the high incidence of postpartum retroversion is referable to maintenance of the supine posture during the postpartum period, together with involution which is sufficiently rapid to allow the uterus to maneuver in the pelvis before the patient leaves her bed.

It was pointed out in the initial paper of this series² that the lowermost portion of the uterus, including the cervix, is firmly fixed in the parametrial and paravaginal tissues. The ligaments attached to the fundus were found to be useless as suspenders, and it was postulated on an anatomic basis that the fundus of the uterus is a movable organ. Halban and Tandler³ had pointed out previously that, "Because the uterus in a physiologic manner is a movable organ, one may not speak, therefore, of the unconditional maintenance of a definite uterine position . . ." Why, then, does the uterus lie anteriorly, in the so-called "normal position," in the majority of women? It is suggested that this is due to the forward tilt of the pelvis in the erect posture, in which healthy women spend a majority of their waking hours. The fundus, therefore, gravitates more readily anteriorly than posteriorly.

Whether or not this explanation is correct, the data here presented indicate that a uterus which is free both from old adhesions and active

band, and upon investigation, have discovered that an overzealous interne had gotten permission for operation, but the patient had not understood. One must also be circumspect where religious beliefs are opposed to the operation.

We are all familiar with the fact that at times statistics cannot be depended upon, but up to the present time we have no other means of knowing accurately what our end-results are. It has been our custom at the Philadelphia Lying-In Hospital to check accurately, statistics on various procedures from time to time in order to be sure that our results are as satisfactory as we believe them to be. It is my purpose, therefore, to show to you, very briefly, our statistics on those patients upon whom we thought it advisable to perform sterilization operation.

RÉSUMÉ OF STERILIZATIONS

Of 17,130 admissions to the Philadelphia Lying-In Hospital from Oct. 1, 1924 to Dec. 31, 1933 (nine years, three months), there were: Obstetrical cases, 14,038 or 81.94 per cent, and gynecological cases, 3,092 or 18.05 per cent.

Of the total 17,130 cases admitted, 223 or 1.30 per cent were sterilized: At cesarean 111 or 0.64 per cent, at hysterotomy 19 or 0.11 per cent, and at gynecologic operation 93 or 0.54 per cent.

Of the 223 patients sterilized: 155 or 69.5 per cent, answered *no* to questionnaire (no future pregnancies after sterilization); 5 or 2.2 per cent died; 63 or 28.2 per cent, letters returned or no answer.

The patients' ages ranged from fifteen to forty-four, the average age being thirty. The parity ranged from one to seventeen, the average, 3.7. The religion included Protestant 106, Catholic 53, Jewish 7, Quaker 1, Greek 1, and unknown 55.

Indications for sterilization were as follows: Cesarean section: second section 53, third section 11, toxemia 13, cardiac 13, renal 3, severe varicose veins 1, difficult labors 2, active tuberculosis 1, psychiatric cases 2, sclerosed cervix 1, suspension at previous operation 1, placenta previa, para vi, poor health 2, epilepsy 1, first pregnancy nineteen years ago 1, phlebitis 1, hyperneurosis 1, previous plastic 3, and para vii, forty-three years, premature separation 1.

Indications for sterilization at hysterotomy: Toxemia 6, cardiac 5, renal 2, hyperneurosis 1, multiple myomas, gastric ulcer 1, tuberculosis 2, diabetes 1, and epilepsy 1.

Indications for sterilization at gynecologic operation: Laceration of cervix, laceration of pelvic floor and prolapse 85, toxemia, para x 1, cardiac 2, extensive plastic 1, ovarian cyst, para iii, poor health 1, left tubal pregnancy, ruptured 1, right ovarian cyst, prolapse, varicose veins broad ligament 1, and Parkinsonian disease 1.

Anesthesia: Gas-ether 159, ether 31, spinal 2, local 20, novocaine, gas and oxygen 3, nitrous oxide and oxygen 6, chloroform 1. and ether and novocaine 1.

Causes of morbidity (147): Postoperative reaction 94, pulmonary infections 13, urinary tract infections 7, myocarditis 2, sepsis and endometritis 13, wound infection 5, breast abscess 1, peritonitis 1, pelvic abscess 1, diabetic complication 1, emotional reaction 1, gastrointestinal upset 4, dehydration 1, postoperative cervical hemorrhage 1, and phlebitis 2.

In 223 cases there were 5 or 2.24 per cent adult deaths: Nephritic toxemia 1, pulmonary embolism 1, acute myocardial failure 1, peritonitis, premature separation 1, and lobar pneumonia 1. The nephritic toxemia was an emergency case which did not respond to treatment. Pulmonary embolism occurred thirteen days following operation

disease may alter its position in response to body postures if they are maintained for a sufficient length of time. In other words, the completely normal uterus is a movable organ within certain limits. The cervix is anchored, but the fundus is free to move in the anteroposterior plane. Its movements are executed very slowly, because being suspended in a semifluid medium, its effective weight is small.

CONCLUSIONS

1. Thirteen (65 per cent) of 20 women with normal pelvic viscera, confined to bed with pulmonary tuberculosis, were found to have a retroversion of the uterus. Four of the remaining 7 who were found to have anteversion at the initial examination habitually rested in bed either on the side or abdomen, and 2 were out of bed much of the time.

2. A change of uterine position was effected in 18 (90 per cent) by altering the patient's posture in bed.

REFERENCES

(1) *Schauffler, Goodrich C.*: J. A. M. A. 99: 726, 1932. (2) *Mengert, William F.*: AM. J. OBST. & GYNEC. 31: 775, 1936. (3) *Halban, Josef, and Tandler, Julius*: Anatomie und Aetiologie der Genitalprolapse beim Weibe, Wien und Leipzig, 1907, Wilhelm Braumüller.

DISCUSSION

DR. WILLIAM T. BLACK, MEMPHIS, TENN.—A change in position of the uterus has been noted by me on various occasions, before and after operation.

The essayist has only investigated normal uteri. The retrocessed, anteverted uterus, which is usually small, does not change position. This condition is due to an endocrine dysfunction and an absence of muscular development which prevents proper rotation forward of the uterus.

Dr. Mengert has shown that the paravaginal and uterine tissues are essential for normal uterine support. There are, however, intraabdominal pressure and pelvic viscera to be reckoned with, as well as the serous and two muscular ligaments. If the uterosacral ligaments are shortened by suture to the cervical fascia, the cervix comes back to a normal position and probably would remain in this position. Shortening and fixing the round ligaments helps maintain this position. The round ligaments do not support the uterus, but if they are shortened and fixed to other structures, the uterus will remain in position indefinitely.

A lack of a good general musculature, plus a reduction in the blood volume in these organs in a resting position, causes a more flaccid condition, and assists in the change of uterine position, especially in the anemic patient.

A practical lesson should be drawn from this work, namely, that we should know about the previous uterine position of patients and study their symptoms carefully before advising an operation upon the uncomplicated retrodisplaced uterus.

DR. ERWIN VON GRAFF, DES MOINES, IOWA.—One of the main arguments against total hysterectomy has always been that the removal of the cervix favored prolapse of the vagina. We have never seen a prolapse of the vagina in these patients, which was not surprising, for Tandler and his school proved, long ago, that the uterus and the vagina each had their individual support.

These statements are of practical consequence in regard to the technic of abdominal total hysterectomy. In the belief that the vagina would otherwise prolapse, it has seemed necessary to many operators to fix the stumps of the infundibulopelvic

any claim for its originality, we have used his name in connection with this operation, and on our records it is known only as the Pomeroy operation.

The procedure consists simply in picking up the middle portion of each fallopian tube, ligating it with an *absorbable* suture and then resecting the loop. The importance of using an absorbable suture cannot be stressed too much, because when one uses a silk ligature the chances of fistula formation are unquestionably increased. Practically no bleeding occurs, although when doing this by the vaginal route some tearing of the mesosalpinx may occur and give rise to moderate hemorrhage. I have never seen hemorrhage in doing this operation by the abdominal route which required any extensive ligation or resection of the tube. At subsequent laparotomy upon four of the patients in this series, it was definitely demonstrated that the cut ends had drawn apart and that the plastic exudate of the peritoneum had become organized in such a manner that it did not seem possible for a fistula to occur. Both ends of the tubes were shrunk up to a very narrow strand. In addition to having the opportunity of studying these cases at subsequent operation, we have injected lipiodol into the uterine cavity of many of them. In no case was there any escape of lipiodol from the uterine cavity.

I have heard some criticism of this very simple operation. In fact I have seen the sections from a patient who afterward became pregnant, and was particularly impressed with the fact that it was necessary to cut 1,300 serial sections before the tubal lumen could be demonstrated. I would be of the opinion that in this particular case the spermatozoa were endowed with unusual persistency and vitality. Furthermore, I have operated upon one patient who had the right fallopian tube resected and the left round ligament. Unquestionably it is necessary to do this operation on both fallopian tubes for it to be successful. We do not feel at the present time that this operation may not at some time in the future be a failure in one or more cases, but in this rather large series it has proved so satisfactory that we believe we shall continue to use it until it has been proved otherwise.

Bishop and Nehms in 1930 reported a hundred patients sterilized by this method with no known subsequent pregnancy. In their paper they have summarized the results of the various other tubal procedures in practically all of which there was a fairly high percentage of pregnancies following the operation. It is only by adding statistics to the literature that we may eventually come to some conclusion as to what is really the best method of operating upon the fallopian tube to prevent impregnation. I believe that the two important steps in this operation are not to crush the tube, and the use of an absorbable suture. If I could find in the literature at the present time statistics showing a lower incidence of failures than have occurred in our own series, I should be perfectly willing to change this method; until, however, I have actually had in my own service, or have seen reported by other individuals, these statistics, I feel that the simplicity and safety of this operation warrants its continued use.

ligaments or adnexa to the vagina. At the Wertheim Clinic, we purposely avoided making this contact because (a) we knew that it was unnecessary, (b) it encouraged stump exudates, and (c) eliminating the procedure saved time.

DR. J. C. LITZENBERG, MINNEAPOLIS, MINN.—When we speak about the position of the uterus we may refer to any one of four quite different things, namely, flexion (attitude), version (tipping), cession (distance from symphysis), or station (presence or absence of prolapse). Substituting the word "station" for "position," I agree that Dr. Mengert has proved his thesis as to the station, in other words, as to prolapse of the uterus. I am unconvinced that he has proved his thesis as to the version of the uterus.

Anybody who has studied under Tandler will agree that the so-called ligaments of the uterus have nothing to do with version, but that intraabdominal pressure is the thing upon which version of the uterus depends. Furthermore, intraabdominal pressure is dependent upon the tone of the muscles of the abdominal walls and an intact pelvic floor.

DR. CHARLES F. MOON, OMAHA, NEB.—I would like to ask whether Dr. Mengert considered the relation of a fixed point in measuring the station of the uterus rather than a movable point. It seems to me that using the ischial spines as a fixed point rather than the introitus, which is a movable point, would give a more scientific measurement.

DR. CARL P. BAUER, CHICAGO, ILL.—I think one very important fact has been left out, that is, that women who have not had children and have retroversion have a very short anterior vaginal wall, and those that acquire retroversion have a very long anterior vaginal wall.

DR. MENGERT (closing).—Dr. Black pointed out that muscle tone had a great deal to do with the matter, and that is unquestionably true. The first part of our study was done on cadavers, most of them warm, but nevertheless we were not dealing with normal muscle tone, and the same thing is true of the muscles of women who have been in bed for a long time.

I cannot see how intraabdominal pressure can hold the uterus anteriorly or posteriorly. We all know, or have heard, that if a diver lies down on the bottom of the ocean, the pressure of the water above will not hold him down because the pressure is transmitted equally in all directions. I cannot see why, if a uterus is thrown backward, intraabdominal pressure will hold it there, for there is bound to be the same pressure underneath the uterus that there is on top of it.

In the actual measurements we had a string tied to a weight and led over a pulley at the foot of the table. The cadaver did not move on the table, so it represented a fixed point. The descent of the uterus was measured by comparing a chosen point on the string with a meter bar.

DR. J. C. LITZENBERG, MINNEAPOLIS, MINN.—If intraabdominal pressure were exactly hydrostatic pressure, Dr. Mengert's objection would be correct because the fluid would then be under the uterus as well as above it. But it is not water, it is the intestines and their contents and the intraabdominal pressure is applied to the uterus by the intestines. If anything occurs to permit the intestine to slide anterior to the uterus, then intraabdominal pressure ceases to act upon the posterior surface of the uterus and the uterus may tip backward. It is Tandler's conviction that the uterus is held in version by intraabdominal pressure which is dependent upon an intact pelvic floor. As long as the intestines are behind the uterus, as in a normal woman, it will be held anterior. He has also stated that the reason the uterus is held in retroversion is the same force, and that the ligaments have nothing to do with maintaining either anteversion or retroversion.

THE MONTH OF CONCEPTION OF 935 CONGENITALLY MALFORMED INDIVIDUALS

DOUGLAS P. MURPHY, M.D., PHILADELPHIA, PA.

(From the Gynecean Hospital Institute of Gynecologic Research and Department of Obstetrics and Gynecology, University of Pennsylvania)

INTRODUCTION

FOR the City of Chicago, Petersen has found a greater frequency of conceptions of congenitally malformed individuals during the months of March and April (120 per cent of expectancy), than in July, August, and September.¹ Throughout the spring months, he also notes a greater variability in barometric pressures than during the summer season.

Believing that human protoplasm is more unstable in spring than in summer, he suggests that there may be a cause and effect relationship between the spring variations in barometric pressures and the unusually high conception rate of malformed children observed by him at that time.

Recently, the month of conception of 935 congenitally malformed children born in the City of Philadelphia was determined. This information is of interest in the light of Petersen's conclusions.

MATERIALS AND METHODS

To quote from a previous communication,² the material forming the basis of this report was collected in the following manner:

"There were found in the files of the Bureau of Vital Statistics, Department of Health of the Commonwealth of Pennsylvania, 130,132 death certificates for all stillborn and liveborn individuals who died in Philadelphia during the five-year period between Jan. 1, 1929 and Dec. 31, 1933. Each of these certificates was examined, and the data on those noting the existence of any congenital defect were transcribed to duplicate, official forms. Fourteen hundred and seventy-six such certificates were located.

The deceased individual was considered to have possessed a defect under either of two conditions: (1) If the defect involved the surface of the body, or (2) if internal, its presence had been disclosed by operation or necropsy. Diagnoses not conforming to these requirements were considered as not verified and were excluded from further consideration. This procedure reduced the number of usable certificates to 899, or only 60 per cent of the original 1,476 certificates.

CUTANEOUS HEMORRHAGE DURING PUERPERIUM WITH LATER DEVELOPMENT OF ACUTE YELLOW ATROPHY

MELVIN L. STONE, M.D., AND JOSEPH J. BUNIM, M.D., NEW YORK, N. Y.

(From the Department of Obstetrics and Gynecology and the Department of Medicine, New York University College of Medicine, the Obstetrical and Gynecological Service of the Third [New York University] Surgical Division, and the Medical Service of the Third [New York University] Medical Division, Bellevue Hospital)

NONTHROMBOCYTOPENIC purpura during the puerperium is exceptionally rare. In searching through the literature we have been able to find but one case,¹ a twenty-four-year-old primipara who developed petechiae and hematuria twelve days after premature (seven months) labor. Two days later the patient developed severe headache and the petechiae spread from neck to face, conjunctivae and trunk. Besides hematuria, a bloody sputum appeared. The outcome was fatal. In reporting this case the author adds that an older sister of this patient had died fourteen days previously during the sixth month of her pregnancy following a febrile course (39.8°) complicated by purpura. Immediately after purpura appeared the patient went into premature labor and died of postpartum hemorrhage. Wiener reported these observations in 1887 and no laboratory material is available to determine the type of purpura. The hematuria, hemoptysis and fatal outcome would seem to indicate that this probably was not a case of nonthrombocytopenic purpura.

Because of the rarity of this condition during puerperium and its obscure etiology we thought it would be worth while to report the following case:

Lillian L., white, aged twenty-seven, reported to the Ante-partum Clinic on May 26, 1934, during the third month of her first pregnancy. Her past menstrual and family histories were nonecontributory, and she presented no complaints. Physical examination was completely negative and the pelvis was found to be ample in all diameters. During her twelve subsequent visits to the clinic she had no complaints except for an occasional cramp in the left leg; her weight was found to have gradually increased from 149.5 to 178 pounds; urines were uniformly negative; blood pressure varied from 98/60 to 120/96; Wassermann was negative; the fetal heart sounds were first heard on November 1 and were normal at all subsequent examinations; the position at the last visit was diagnosed as R.O.T.

On Jan. 10, 1935, she was referred to the hospital for induction of labor since she was fourteen days past her expected date of confinement and a relatively large baby was suspected. On admission the patient offered no complaints and looked well. Blood pressure 120/84. The fetus was large and in R.O.T. position with an unengaged but dipping head. Patient was given castor oil (60 c.c.), quinine (0.3 gm.), and an S. S. E. with no effect. January 12, with the cervix thick and one to two fingers dilated, irregular weak pains began. January 13 castor oil, quinine, and S. S. E. were repeated as on admission. Not until the morning of January 14 was the cervix completely dilated. The membranes were then artificially ruptured, normal amniotic fluid liberated, and three hours later, when satisfactory progress had ceased, an episiotomy was performed, the head was rotated from R.O.T. position by a Kielland and then delivered by a Tucker-McLane forceps. This procedure was not particularly difficult, the total blood loss was 300 c.c., the duration of labor was forty hours, and the child weighed 4,570 gm. It should be added that the delivery was preceded by rectal analgesia (60 c.c. of ether plus 52 c.c. of olive oil plus 0.6 gm. of quinine plus 8 c.c. of alcohol) and later supplemented by inhala-

The months of conception of the 935 defective persons and of their 1,590 normally developed siblings are compared in Table II, where their percentage frequency of occurrence is also shown. The latter percentages are expressed graphically in Fig. 1. Here the horizontal line, marked "N," represents the percentage frequency of distribution of all of the conceptions of both defective and normal individuals, had they been equally distributed throughout the twelve months of the year.

From these data, it appears that these *defective* individuals born in Philadelphia were not conceived most often in the months of March and April as found by Petersen, but in the months of June, July, and August, the time at which he noted the least frequency of occurrence. And, as shown in Fig. 1, the *normal* siblings of the defective individuals were conceived most often in the *spring* months and least often in the *summer* months.

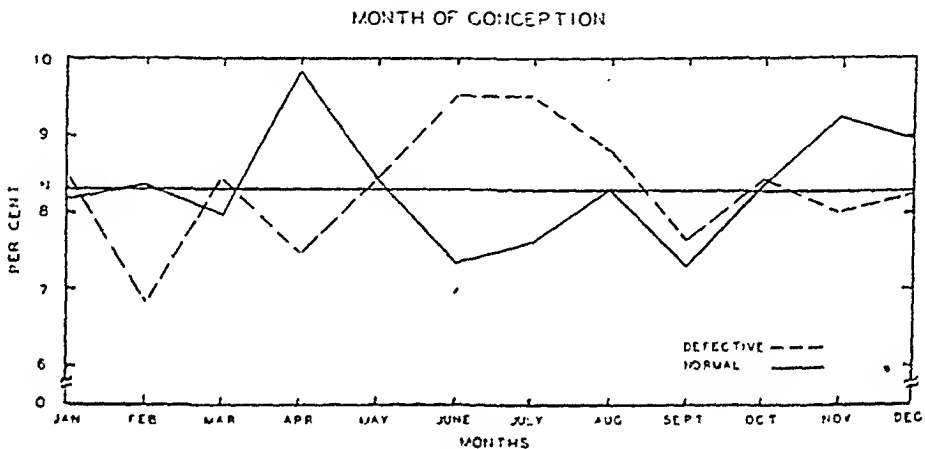


Fig. 1.—Showing the month of conception of: (a) the 935 congenitally malformed individuals, and (b) 1,590 of their normally developed siblings. Data are taken from columns 3 and 5, Table II. Base line represents months. Vertical line records percentage distribution. Line "N" represents the percentage distribution, had the 2,525 conceptions been evenly distributed throughout the twelve months. Note the greater frequency of conception of malformed individuals in the *summer* months, and of the normal individuals in the *spring* and *fall* months.

TABLE II. MONTH OF CONCEPTION OF CONGENITALLY MALFORMED CHILDREN AND OF THEIR NORMALLY DEVELOPED SIBLINGS

MONTH	CONCEPTIONS			
	DEFECTIVE		NORMAL	
	NUMBER	PER CENT	NUMBER	PER CENT
(1)	(2)	(3)	(4)	(5)
Jan.	79	8.45	130	8.18
Feb.	64	6.84	133	8.36
Mar.	79	8.45	127	7.99
Apr.	70	7.49	157	9.88
May	79	8.45	134	8.45
June	89	9.52	117	7.36
July	89	9.52	121	7.61
Aug.	85	8.88	132	8.30
Sept.	72	7.69	116	7.36
Oct.	79	8.45	133	8.36
Nov.	75	8.02	147	9.24
Dec.	77	8.21	143	8.99
Totals	935	100.00	1590	100.00

tion anesthesia (nitrous oxide plus ether plus oxygen through Gwathmey apparatus). Immediately after delivery she was given 1 c.c. of pituitrin and 1 c.c. of ergotamine tartrate.

Within an hour the patient complained of chilliness and looked pale. Pulse was 140 and blood pressure 80/60. Three hundred cubic centimeters of gum acacia-glucose solution were given intravenously, following which blood pressure rose to 120/74 and pulse fell to 110. Six and one-half hours after delivery she became stuporous and dyspneic. Ventricular rate 140, extremities cold and clammy, pulse imperceptible, and blood pressure unobtainable.

A striking purpuric manifestation now appeared. The cheeks, nose, chin, and lower forehead took on a bluish-black discoloration while the circumoral and circum-orbital areas remained conspicuously free. The entire face was considerably edematous (Fig. 1). The gums were deep blue but the tongue and buccal mucous



Fig. 1.—January 15. Photograph taken twelve hours after onset of purpura.

membranes were of normal color. The shoulders and lateral surfaces of arms and forearms assumed a fainter cyanotic hue, while the fingers and nail beds remained unchanged. Eye grounds were normal. Oxygen inhalation did not affect any of the discolorations. Spectroscopic examination of blood was negative for methemoglobin, urine examination was negative for phenol, cyclic amines and benzine, and Rumpel-Leede test at 65 mm. of mercury (blood pressure 94/70) was negative at end of two minutes.

The signs of shock responded favorably to transfusion (500 c.c. of whole blood), intravenous gum acacia glucose (200 c.c.), and application of heat administered within several hours after purpura appeared. The discoloration, however, persisted and a few small additional areas later appeared on lateral aspects of both thighs. The following day the blood pressure was 114/74, nonprotein nitrogen 37 mg. per 100 c.c., BUN 28 mg., and Hb. 69 per cent. Catheterized urine showed sp. gr. of 1.015, albumin trace, leucidine four plus, and uric acidogen present in 1:20

From a study of the above records, the month of January of the year 1929 was found to exhibit the greatest degree of barometric variability. A tracing of the record of the first twenty-eight days of this month is reproduced in Fig. 2, where it can be compared with a similar tracing for the month of July of the same year. These two tracings indicate the differences in barometric variability observed in these months in the region of Philadelphia.

DISCUSSION

From the available data, I am unable to find any significant, seasonal incidence of the conception of congenitally malformed individuals in Philadelphia. Nor am I able to correlate the conception rate of defective persons with the rate of change of barometric pressures. That I cannot confirm the findings of Petersen may possibly be due to differences in barometric conditions as met with in Chicago and Philadelphia.

Changes in pressure in the latter city, however, even during periods of greatest variability, are slow, as indicated by the record portrayed in Fig. 2. The slowness with which the most rapid changes occur in Philadelphia makes it difficult to believe that they can influence the development of the human embryo in utero. Unless the pressure changes in other places are considerably more rapid than in Philadelphia, it does not seem likely that they play any rôle in influencing the conception rate of congenitally malformed individuals. If a preponderance of such conceptions does take place at certain seasons of the year, in other localities than Chicago, other factors than barometric pressure changes and weather conditions may have to be ruled out before a final decision can be made in favor of the weather. Future reports by observers in other places are awaited with interest.

SUMMARY AND CONCLUSIONS

1. Data are presented on the month of conception of 935 congenitally malformed children who died in Philadelphia during the five-year period between Jan. 1, 1929, and Dec. 31, 1933, and concerning the month of conception of 1,590 of their normally developed siblings.

2. More than 90 per cent of the defective individuals were born in Philadelphia, and approximately an equal proportion died within a year of birth.

3. No evidence can be found to support the view that in Philadelphia there exists any significant, seasonal trend toward the conception of congenitally malformed children.

REFERENCES

dilution and many R.B.C. Bleeding time (Duke) was two and one-half minutes; coagulation time (capillary tube) three minutes; sedimentation rate 18 mm. in sixteen minutes; and platelet count was normal.

On January 18 the color of the involved areas began to change gradually to a violaceous redness and the eruption assumed a vesicular character, small epidermal blebs containing clear serum became visible. Within next few days these blebs ruptured and desquamation occurred. This process had no resemblance to the sequence of events usually noted in the fading of ecchymosis and no yellow zone of discoloration remained to mark the site of the original lesion. By January 31 the skin appeared perfectly normal (Fig. 2).

On the fourth day postpartum she developed a temperature of 100° F. which gradually rose during the next six days to 102° F., slowly returning to normal. This was believed to be due to a staphylococcus infection of the perineal wound. Before



Fig. 2.—January 31. Appearance of patient on discharge.

discharge, patient was tested for hypersensitivity to fluid extract of ergot by oral, patch, and intracutaneous methods and was found to react normally. On Feb. 9, 1935, mother and baby were discharged in excellent condition.

On Feb. 20 she was seen in postnatal clinic. Her general condition was excellent. Perineal wound well healed. No complaints except for a mild diarrhea the previous day. On February 25 she returned, now appearing markedly jaundiced (for the fourth day) and complaining of dizziness, headache, pruritus, clay colored stools, and vomiting for the past twenty-four hours. Her temperature was 103.8° F. and she was admitted to the Third (N. Y. U.) Medical Division. On examination she did not look severely ill; smooth liver edge was palpable two fingerbreadths below costal margin; blood pressure 95/75; and rest of examination was negative. Bile was present in urine and urobilinogen was present in undiluted urine but absent in 1:10 dilution. The blood count was normal. Qualitative Van den Bergh showed direct immediate reaction and the icteric index was 150. The bromsulphalein test

attended health stations showed that fully half the white infants and approximately three-fourths of the negro infants have definite signs of rickets."

The present communication is based on a study of the pubic and iliac portions of the line of "terminal length" in the pelves of fifty women and in order to make the study somewhat clearer I may briefly outline the "Terminal Length" theory of Breus and Kolisko.⁶ These authors maintain that the relative flattening of the superior strait in the adult pelvis is due not so much to mechanical forces but to differences in rate of growth before puberty of certain portions of the pelvic bones. They pronounce particular importance upon the so-called terminal length of the innominate bone. They point out that if we saw through the innominate bone at the level of the iliopectineal line and view the sawn surface of the upper half, we shall see that the surface may be arbitrarily divided into three parts, the sacral, iliac, and pubic portions. These are practically of equal length, the whole being in the neighborhood of 20 cm. In the period of development these portions arise from the following, the sacral portion from the cartilage of the iliac crest, the iliac portion from the Y-shaped cartilage of the acetabulum and the pubic portion from the same cartilage and from that of the symphysis. These authors contend that the variations in the rate of growth of these three portions are the most important factors in determining the shape of the pelvis and that mechanical factors play a distinctly minor rôle.

They further state that in rachitis the pubic portion retains its normal proportions, the iliac portion being greatly shortened and the sacral portion slightly shortened. When this change is present, they state that it is almost pathognomonic of rachitis.

With these facts in mind it occurred to me that a study of terminal length components, particularly the pubic and iliac portions in the female, round and anthropoid types of pelvis might show something of interest. Accordingly, twenty-five female type pelves and twenty-five round and anthropoid type pelves were studied by roentgen pelvimetry, with results shown in Tables I and II.

In surveying the tables it will be noted that in the "female type series" the difference between the length of the pubic and iliac portions of the terminal length is far greater than that in the "round and anthropoid series." In nearly all instances the iliac portion is from 1.0 to 2.25 cm. shorter than the pubic portion.

It might be well to state that in studying the roentgenograms of the superior strait in both series, the point at which the shadow of the acetabulum makes its nearest approach to the iliopectineal line, was chosen as the junction of the pubic and iliac portions, the center of the symphysis pubis and the shadow of the sacroiliac articulation

indicated 100 per cent retention. The urines of the following three days contained no urobilinogen and were positive for bile. The stools were negative for bile.

During the next week her temperature fluctuated between 100° and 103° F., and jaundice increased somewhat. On March 3 the patient became delirious and unmanageable and was transferred to the Psychiatric Division. On March 4 she was still delirious, bilateral Babinski's were noted, right ankle clonus noted, and liver edge was still palpable two fingerbreadths below costal margin. During the evening she sank into coma, developed pulmonary edema, and died early the following day.

Autopsy.—(No. 21670.) (Dr. Eugene Clark.) Performed six hours after death. External examination revealed no hemorrhages in either skin or mucous membrane. The chief pathologic changes were found in the liver. It seemed reduced in size. Its inferior margin was 2 cm. above costal margin and it weighed 1140 gm. The surface was smooth and of a pale yellowish brown color. The consistency was very soft and the organ did not retain its shape when handled. On section the cut surfaces were studded with discrete bright red foci, 1 to 2 mm. in diameter, separated by intervening tissue of yellowish orange brown color. The gallbladder, bile ducts, and blood vessels were normal. The lungs showed focal hemorrhages in the parenchyma, and submucosal hemorrhages in bronchi and trachea. The heart and aorta were normal. The spleen revealed hyperplasia of the pulp. There was cloudy

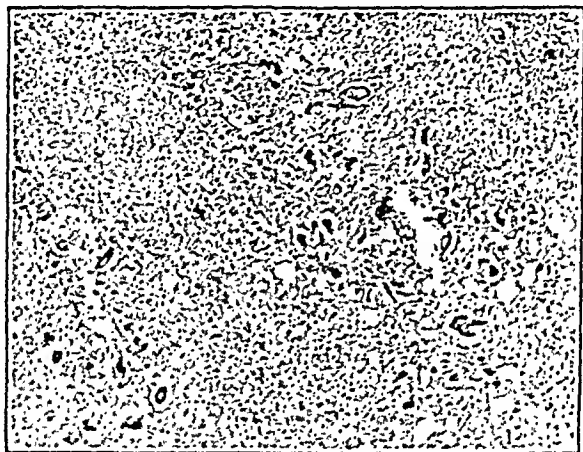


Fig. 3.—Low power photomicrograph of section of liver showing diffuse necrosis and loss of lobular architecture. A number of dilated, empty, small bile ducts can be seen in the field.

swelling of the kidneys. Suberosal and submucosal focal hemorrhages less than 1 cm. in diameter were found in the mesentery, stomach, jejunum, uterus, and urinary bladder. Subarachnoid hemorrhage was found in cisterna magna, about the base of the brain, and to a lesser extent over the hemispheres. There was no jaundice of the basal ganglia.

Microscopic studies.—The liver had undergone such radical alteration that identification was difficult (Fig. 3).

There were large areas presenting a uniform appearance with no recognizable lobular arrangement. There were many diffuse scattered necrotic liver cells in a background of amorphous material and of reticular framework. In other regions the lobular outlines were more readily distinguished and these contained areas where the parenchymal elements had completely disappeared, alternating with those in which the outlines of liver cells were still recognizable. Scattered bile pigment, groups of dilated and empty bile ducts, and foci of lymphocytic infiltration were present. There was no evidence of regeneration. Sections of a lymph node taken from porta hepatis showed acute diffuse lymphadenitis.

Sections of the lung showed focal alveolar hemorrhage and lobular pneumonia; the kidney revealed cloudy swelling; the spleen, hyperplasia and congestion; the uterus, evidence of involution.

being the other end points of these two components. This is illustrated in Fig. 1 and in an illustration from the work of Breus and Kolisko. It becomes evident from this study that in the female type pelvis the

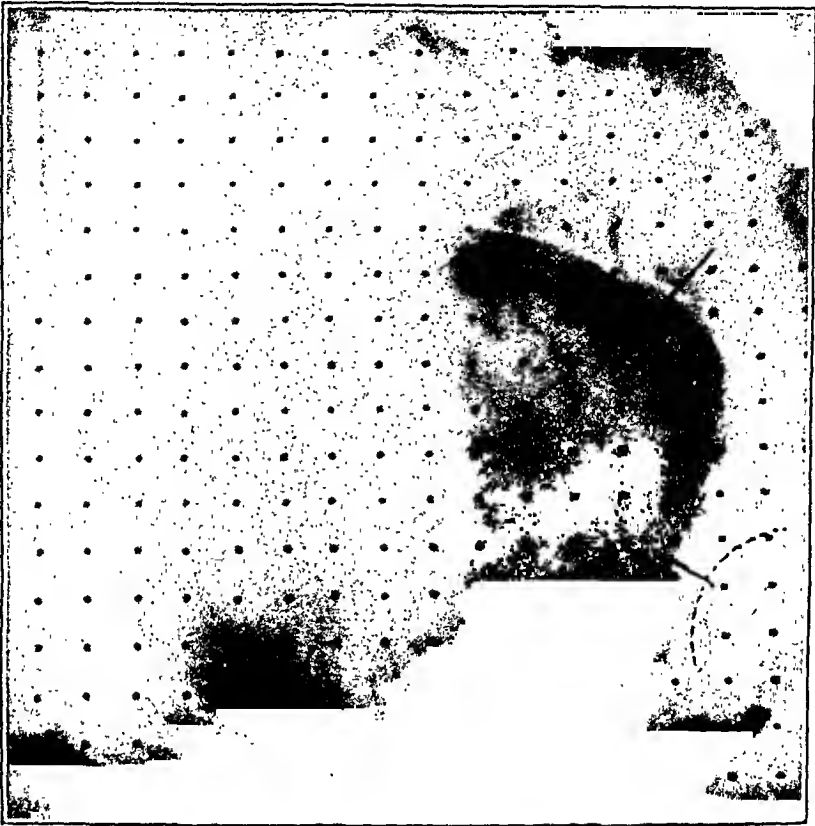


Fig. 1.—Roentgenogram showing division of pubic and iliac portions. Dots represent corrected centimeters in the plane of the superior strait.

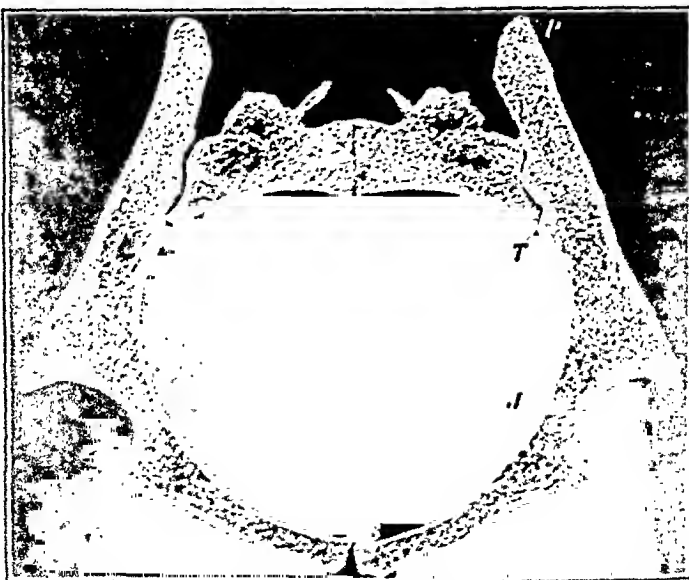


Fig. 2.—Under surface of superior strait in "female type" pelvis of thirty-six-year-old woman, showing divisions of terminal length: anteroposterior diameter 11.5 cm., transverse diameter 13.5 cm., pubic portion of terminal length 7.8 cm., and iliac portion of terminal length 5.0 cm. (From Breus and Kolisko.)

The primary pathologic diagnosis was acute yellow atrophy of the liver. Chemical analysis of the liver was negative for arsenic and mercury.

COMMENT

In 1926 Sir Thomas Lewis and I. M. Harmer² reported a case of cutaneous hemorrhage which bears a striking resemblance to that seen in our patient.

Their patient was a boy of fourteen years with acute lymphatic leucemia whose face became puffy and discolored and affected by a purpuric eruption on cheeks and forehead, following an attack of vomiting. The authors believed that "the purpura was evidently produced by a rise of venous pressure consequent upon diaphragmatic contraction. Since the eruption occurred chiefly in the skin of the face, the breaking point of facial vessels was apparently lower than for remaining cutaneous vessels." It will be recalled that the purpuric eruption in our patient was not preceded by vomiting and that fully six and one-half hours intervened between the end of labor and the appearance of the purpura. If, therefore, it should be true that a relatively lowered resistance of the facial capillaries to a suddenly increased venous pressure is responsible for the purpura we are unable to find the cause of the increased pressure.

It is important of course in seeking for a pathogenetic factor for purpura to consider the question of hypersensitivity. As has been noted, our patient was tested for, but showed no hypersensitivity to, ergot. Her past history of having taken castor oil as well as quinine on a number of previous occasions without untoward reactions excludes these drugs as possible antigens. Sensitivity to gum acacia has been reported both in experimental animals and in man^{3, 4} and must here be considered as a serious possibility. Unfortunately our patient was not tested with this antigen. It will be noted, however, that following the appearance of purpura the patient was again given 300 c.c. of gum acacia intravenously and no reaction followed.

Finally there remains the question of the relationship if any between acute yellow atrophy and the purpura or the preceding pregnancy. We hesitate to consider the acute yellow atrophy as a complication of our patient's pregnancy because more than five weeks elapsed between delivery and manifestations of her final illness; because during this intervening period there was an interval of perfect health and because sections of the liver showed no evidence whatever of any regenerative processes. For the same reasons we hesitate to link the purpuric eruption with the later development of severe liver pathology.

SUMMARY

A case is reported of a twenty-seven-year-old primipara who after a normal pregnancy and forceps delivery developed a purpuric eruption of peculiar distribution. Several weeks following complete recovery from this condition she developed acute yellow atrophy of the liver and died.

The various possible causes of the purpura and the relationship of acute yellow atrophy to the pregnancy and puerperium are considered.

NOTE: Since this paper was completed further facts have been brought to light which would make us feel that the intravenous use of gum acacia glucose was a factor in the production of this clinical picture. These findings will be the basis of a subsequent article to be reported by Studdiford.

REFERENCES

- (1) Wiener, M.: Arch. f. Gynäk. 31: 281, 1887. (2) Lewis, T., and Harmer, I. M.: Heart 13: 337, 1926. (3) Maytum, C., and Magath, T.: J. A. M. A. 99: 2251, 1932. (4) Spielman and Baldwin: J. A. M. A. 101: 444, 1933.

The frequency and, at times, the sudden appearance of severe menopausal symptoms following castration by surgery or irradiation leads to the logical conclusion that the cessation of ovarian function, accompanied by a withdrawal of the ovarian hormone, is the primary factor in the causation of the condition. This conclusion seems further supported by the relief of these symptoms following the hypodermic or oral administration of the female sex hormone.

However, Tandler and Grosz¹ have shown that castration is followed by an increase in size and function of the anterior portion of the hypophysis; and Rossle² found that the histologic changes accompanying this enlargement, the formation of "castration cells," though not present in all cases, usually required a considerable length of time to make their appearance, but that in some instances, they could be observed as early as four or five days after castration. Engle,³ confirmed by Evans and Simpson,⁴ produced further evidence of the increased activity of the anterior hypophysis, resulting from castration, by implanting anterior pituitary glands from gonectomized rats, showing that these were more potent in stimulating the ovaries of immature animals than was such gland substance from normal rats.

Fluhmann⁵ proved that the same results could be elicited by the injection of blood serum from castrated human beings and that the increased function of the anterior pituitary could be demonstrated as early as eight days or as late as thirteen years after total extirpation of the ovaries; he further demonstrated the failure to obtain these results using blood serum from women with normal menstrual cycles at any time during the cycle.

Changes in other glands, aside from the pituitary have been noted. Tandler and Grosz,⁶ as well as Chouke,⁷ have demonstrated a decreased activity in the thyroid gland at the menopause and this may, in part, account for the accompanying obesity. Hannam⁸ and, similarly, Myers and King⁹ have noted an increased sensitiveness to epinephrine in menopausal women and believe that this occurrence furnishes evidence of a hyperadrenalemin occurring at this time. In no other endocrine organ, however, are the changes so prominent as in the pituitary.

From these facts it appears that the withdrawal of the ovarian hormone simply initiates this endocrine disturbance, known as the menopause, and that the symptoms accompanying it are very probably due to a hyperfunction, or hypofunction, of other endocrine organs in the body, with hyperfunction of the pituitary by far the most noticeable change.

The symptoms of the menopause are chiefly manifested by the occurrence of hot flushes, sweats, increased nervousness, headaches and pains and stiffness in the joints. Usually these symptoms are not severe and the woman, approaching this period, expects some discomfort to accompany her change of life. Occasionally, however, these symptoms become especially severe, particularly from surgical castration, and life becomes miserable for women so bothered. The flushes occur in rapid succession and the sweats in such frequency that the patient is continually bathed in perspiration; headaches become a constant annoyance and aggravate a tendency, already present, to increased nervousness.

TRICHOMONAS VAGINALIS VAGINITIS*

A CLINICAL STUDY

HELEN M. ANGELUCCI, M.D., PHILADELPHIA, PA.

(From the Department of Gynecology of the Woman's Medical College.)

IF ALL human trichomonads belong to the same species and the trichomonas in the vagina and bladder are derived from the intestine, we find it difficult to understand why the intestinal strain should be relatively harmless while the vaginal strain, whether found in the vagina, the kidney, the bladder, or the prostate, is so frequently associated with distinctly pathologic conditions.

In the Gynecological Clinics of the Woman's Medical College Hospital and the Woman's Hospital of Philadelphia we examined 1,018 non-pregnant women, representing consecutive admissions to the dispensary, either new patients or patients who had not been seen for at least six months. One hundred and seventy-six or 17.3 per cent of these women showed *Trichomonas vaginalis* in their vaginal secretions examined by the fresh smear method. Of these women, 705 were white and showed an incidence of 13.8 per cent, 323 were colored with an incidence of 24.8 per cent.

The age incidence varied between ten and sixty-nine years, 124 being between twenty and forty years of age. Twelve patients had a coincident gonorrheal infection as shown in the cervical smear.

Variations in seasonal incidence such as reported by Barringer were not uniform, the Woman's Hospital showing a larger incidence in winter and spring, while the College showed the reverse.

The majority of our patients (52.2 per cent) gave as the chief complaint symptoms directly referable to the vaginitis; that is, leucorrhea, burning, pruritus, etc. Here, our figures differ widely from Bland's, who reported that only 13.2 per cent of his patients voluntarily complained of such symptoms. Three-fourths of the patients in our series who did not give such chief complaint, on being questioned, admitted having leucorrhea. The remainder, although denying any discharge, on examination showed varying degrees of leucorrhea, 8 of them being typical cases of acute *Trichomonas vaginalis* vaginitis with profuse bubbly discharge. We believe, therefore, that *Trichomonas vaginalis* is not found in women entirely free of leucorrhea.

Of our series, 62.5 per cent actually had an inflammatory condition of the vulva or vagina. The presence of trichomonas in relatively scanty leucorrheal discharges in a vaginal canal not particularly pathologic.

*Read at a session of the Obstetrical Society of Philadelphia, December 5, 1921.

and on the following day is repeated on the left side; after an interval of approximately three weeks, the same procedure is again performed, making a total series of four exposures, with a total dosage of 592 r to the skin surface. Huet¹⁸ uses a much larger total dosage, and in an experience of three years' duration, he has never failed to obtain relief after a dosage of 2,000 r. No evidence of harmful consequences has occurred.

The symptoms of which these thirty-three women complained were so severe and of such frequent occurrence that they were in a constant state of discomfort and had sought relief from several sources without avail. Every one of these patients had been previously treated with sedatives such as luminal and bromides, and several had received injections of theelin. The failure of these substances to control their symptoms first tempted us to try irradiation of the pituitary gland. The results were so striking in the first few cases that this method has been continued and is employed in all women suffering from menopausal symptoms who experience no alleviation with the use of sedatives.

Only one of our cases, a young woman suffering from a surgical menopause of several years' duration, failed to improve. This patient, when first seen, showed evidences of marked mental deterioration and had been diagnosed as dementia precox by the psychiatry department. Irradiation was attempted chiefly from curiosity to see if any effect could be noticed in this instance. We do not feel that any correct observations can be drawn from this case.

In all of the remaining women, the flushes, sweats, and headaches have decreased in severity and in frequency of occurrence to the point where they are no longer objectionable and, in a good number of cases, have entirely ceased. The nervousness has markedly improved and pains and stiffness in the joints accompanying the menopause have been relieved.

In seventeen of these cases, the menopause had been surgically induced and, in sixteen, it was of natural occurrence. The shortest length of time after irradiation in which improvement was noted has been one week from the first exposure and the longest period to elapse before symptoms were relieved has been six weeks from the first exposure. Improvement is most often noted during the third week of treatment and all patients, except two, have obtained complete relief by the end of three weeks from the last exposure. Two women had obtained only partial relief at the expiration of this time and the flushes and other symptoms, though improved, were still objectionable. In these two cases, two exposures, or one-half of a series, were repeated and relief was promptly obtained. At present, nine months is the longest period of observation for any of these patients; no patients during this period have exhibited a return of their former symptoms or a decrease in the amount of comfort which they had obtained.

In analyzing these cases for this report, it has occurred to us that perhaps the symptoms of the menopause are most probably produced by the excessive amount of prolactin secreted by the hypertrophied anterior lobe of the pituitary, and not due to the withdrawal of the female sex hormone, which simply initiates an endocrine disturbance of which the hyperfunction of the pituitary is the chief manifestation. The fact that relief from menopausal symptoms can be obtained by the administration of the female sex hormone is perfectly compatible with this supposition. Wolff,¹⁹ Smith and Engle,²⁰ Frank, Goldberger, and Spielman²¹ have demonstrated that the concentration of prolactin from the anterior pituitary is lowest when the concentration of the female sex hormone

to May 8, 1934. On May 3, 1934, mass on left side about 1.5 inches in length, sensitive. Uterus tipped to right and adherent. Mass on right side extending to the posterior pelvic wall and behind uterus and holding the uterus fixed. May 8, uterus enlarged, hard, and irregular. Tipped to the right and adherent. On the left side large cystic mass about three inches in diameter, slightly movable. Diagnosis: Now changed to fibroid uterus. Right adnexitis. Left ovarian cyst. Admitted to hospital for operation. Operated upon May 11. Liberation of adhesions, supravaginal hysterectomy, bilateral salpingo-oophorectomy. Operative diagnosis: Adhesive peritonitis. Chronic pelvic cellulitis. Dermoid cyst, left ovary. Intraligamentous cyst, right ovary. Wound dehiscence developed on third day. Paralytic ileus. Ileostomy performed. Patient died in twenty-four hours.

Comment: This patient had a bilateral cystic degeneration of the ovaries with a surrounding inflammation of the pelvic peritoneum. Local treatment for twenty-one days failed to affect the pelvic masses. Operation disclosed the cystic degeneration of the ovaries.

CASE 10.—(A86403) F. G., thirty-five years of age, married eight years, divorced seven years, no children, menses regular, three to four days, painful. Pain in both lower quadrants, two weeks. Backaches past two weeks. Discharge slight. Fever 103° F. Was admitted to the hospital on May 15, 1934. Pelvic floor negative. Vagina negative. Cervix negative. Uterus not definitely made out, large mass to left filling pelvis and extending down into culdesac. Similar mass to right, firm, fixed, tender. Bilateral salpingo-oophoritis. Blood count, 18,850 white blood corpuscles, 90 per cent polymuclear leucocytes. Sedimentation time eight minutes. Temperature ranged between 99° and 103° F. with daily rise for eight days, then became normal and remained so for the next seven days. Had six treatments while in hospital, the treatments being given regardless of temperature. Discharged from hospital May 29. Treatments were continued in the clinic. She received 22 treatments up to July 19, 1934. Elapsed time, sixty-four days. During the course of the treatment a cessation of progress was noted after about ten treatments. The remaining treatments were given to determine what further changes would occur. July 14, the pain in the abdomen and backache disappeared. The painful menstruation was considerably relieved. Uterus moderately movable. Mass on left side, easily defined about four inches in diameter, distinctly cystic, fixed. Right side no palpable pathology. Diagnosis at this examination, ovarian cyst, left, adherent. The similarity of this condition to that of Patient 9 is striking both as to the original pathologic alterations and the subsequent course under treatment. In Case 9 the presence of the ovarian cyst was proved.

Comment: In this patient the inflammatory exudate was apparently absorbed, and the failure of further recession of the mass and its distinctly cystic character make the diagnosis of adherent ovarian cyst most probable. The relief of symptoms was the result of disappearance of the active inflammatory process.

DISCUSSION AND SUMMARY

An effort was made to determine whether the physiologic action of acetyl-beta-methylcholine-chloride could be produced in the pelvis. From the physiologic effects produced on the skin, it seemed reasonable to expect that the prolonged vascular dilatation and the stimulation of circulation would exercise a powerful influence in promoting the absorption of an inflammatory exudate.

The results in the first patient treated were encouraging. There was, however, no large amount of exudate present, and although the painful menstruation and lower abdominal pain were relieved, the patient still

(6) *Tandler, J., and Grosz, S.*: Wien. klin. Wchnschr. 20: 1596, 1907. (7) *Chouke, K. S.*: Endocrinology 14: 12, 1930. (8) *Hannan, J. H.*: Endocrinology 12: 59, 1928. (9) *Myers, W. K., and King, J. T., Jr.*: Bull. Johns Hopkins Hosp. 47: 22, 1930. (10) *Geist and Spielman*: AM. J. OBST. & GYNEC. 23: 697, 1932. (11) *Hamblen, E. C.*: Endocrinology 15: 184, 1931. (12) *Dodds, E. C.*: AM. J. OBST. & GYNEC. 22: 520, 1931. (13) *Kurzrok, R.*: Endocrinology 16: 366 and 368, 1932. (14) *Groedel*: München. med. Wchnschr. 69: 423, 1922. (15) *Werner*: Ztschr. f. Gynäk. No. 31, 1923. (16) *Borak, J.*: Brit. J. Radiol. 23: 293, 1924. (17) *Borak, J.*: Strahlentherapie 33: 142, 1929. (18) *Huet, J. A.*: Bull. et mém. Soc. de radiol. méd. de France 21: 561, 1933. (19) *Wolff, J. M.*: Am. J. Anat. 48: 391, 1931. (20) *Smith, P. E., and Engle, E. T.*: Anat. Rec. 42: 38, 1929. (21) *Frank, R. T., Goldberger, M. A., and Spielman, F.*: Proc. Soc. Exper. Biol. & Med. 28: 999, 1931.

NOTE: The authors wish to thank Miss Margaret M. Sanders for her assistance in this work.

NEMBUTAL IN THE TREATMENT OF PREECLAMPSIA AND ECLAMPSIA

JULIAN WALDO ROSS, M.D., WASHINGTON, D. C.

(From the Department of Obstetrics and Gynecology, Howard University School of Medicine and Freedmen's Hospital)

THE management of preeclampsia, heretofore, has comprised, chiefly, the various means of combating the toxemia with the hope that ultimately all would end well. But this method did not include the use of drugs primarily to prevent the onset of convulsions. As a result many cases of preeclampsia have progressed into eclampsia, the convulsive phase which otherwise might have been averted.

A few drugs, however, e.g. morphine, chloroform, chloral hydrate, and magnesium sulphate, have been employed with varying success to control the convulsions in eclampsia; but these have not been without their added dangers to the already damaged organs and tissues. Because of this fact their routine use has been contraindicated more often than not.

Although the pathologic changes in preeclamptic toxemia differ in no wise from those of eclampsia except in degree, the clinical difference to be feared most is the appearance of convulsions. Hence, the need of a drug or drugs which would both prevent and control convulsions and at the same time offer the least insult to an already damaged organism has long been a pressing desideratum.

The treatment of preeclampsia and eclampsia not unlike that of many diseases is both prophylactic and active. The prophylactic treatment of preeclampsia includes preconceptional and prenatal care. With the use of nembutal, the active treatment of the nonconvulsive phases of preeclampsia is a rational prophylactic treatment of eclampsia.

During the past three years, thirty-five cases of preeclampsia were treated with nembutal (0.1 gm. capsules per os, one four times daily)

In Chart 2 are listed all patients who were admitted with a normal temperature, with a comparison in average temperature range, hospital days, mortality, and complications between those of the group where the uterus was emptied on admission by means of the ovum forceps and those treated conservatively. It will be noted that of the patients treated conservatively, 132 required operative intervention before discharge, which was done on an average of 4.9 days after admission. Of the radically treated group, 19 required a second operative intervention, averaging 5.3 days after admission.

The value of "P" requires explanation. In the comparison of factors in unequal groups of a limited quantity an obvious source of error is that the observed difference may be due to chance rather than to an actual difference. Through the courtesy of Dr. A. T. Rasmussen, of the University of Minnesota, a formula used by Dunn for the deter-

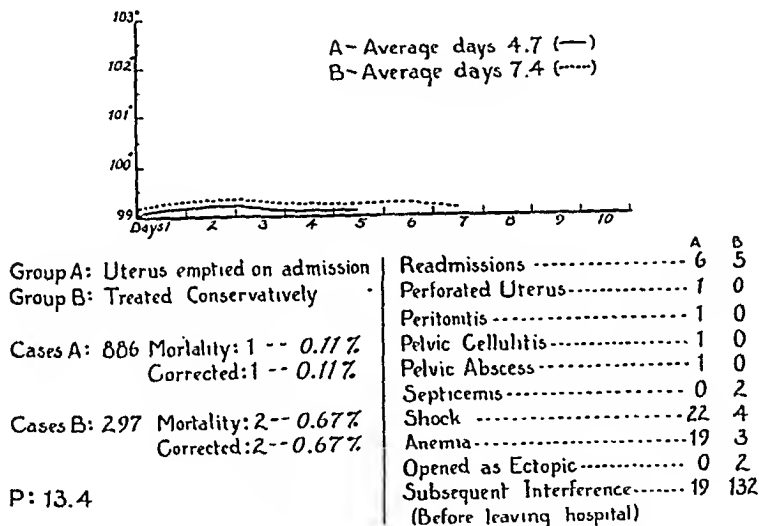


Chart 2.

mination of statistical significance of comparisons in limited samples was modified to apply to the problem at hand. The modification was in expressing the answer in parts of 100 rather than in fractions of one.

Substituting in the formula the total cases in each group and the mortality in each group, it is found that "P" equals 13.4, or that there are 13.4 chances in 100 that the difference in mortality in the two groups is due to chance or "random sampling" or limitation of the sample rather than to a true difference of statistical value. As for real statistical significance there should not be more than one chance in 100 that the difference is apparent rather than real; it is obvious that in this comparison the difference in mortality is meaningless.

MORTALITY

Group A.—(1) White, married, aged twenty-two, para i, gravida ii. Gestation, two months. Self-induced. Died in thirty-six hours. Autopsy: Perforated uterus; generalized peritonitis.

The results of our observations and experience warrant the following definite conclusions:

1. That nembutal eminently fulfills the described need for a drug capable of preventing convulsions but free of any possible harmful effect on organs already damaged.

2. That early treatment of preeclampsia including the use of nembutal precludes the occurrence of eclampsia.

3. That nembutal prevents, promptly stops, and effectively controls convulsions in the treatment of preeclampsia and eclampsia.

The problem of preeclampsia and eclampsia is a problem of toxemia and convulsion, potential or actual. Nembutal effectively controls the latter and with this control the former is clinically mitigated. Its specific rôle is not clear and further investigations are aimed at an explanation of this mechanism.

FATALITIES

There were three deaths in our series. The first occurred in a patient brought into the hospital comatose and with a temperature of 104° F.; death followed closely the second intravenous injection of magnesium sulphate 10 per cent, 20 c.c. each. As this case was an emergency, time did not permit a determination of the concentrating ability of the kidneys, which, if low, would have contraindicated the use of the magnesium sulphate. Hirschfelder and Serles¹ state that "coma simulating that of uremia may result from magnesium sulphate in patients with badly diseased renal tubules"; whereas, Murphy and Koppányi,² Pratt³ and Gillespie⁴ have demonstrated experimentally that nembutal does not impose an extra burden on the kidneys. The second death occurred in a patient given morphine sulphate before entering the hospital and generous doses of chloral hydrate per rectum after admission.

It is regretted that a necropsy was not obtainable in either of these cases.

SUMMARY

1. In thirty-five treated cases of preeclampsia, nembutal prevented the onset of convulsions; whereas, three patients treated without nembutal developed convulsions.

2. Nembutal promptly stopped and completely controlled the convulsions in twenty-four treated cases of eclampsia.

3. The use of nembutal, per os, intravenously, or per rectum, in the treatment of preeclampsia and eclampsia is clinically superior to, and safer than, chloroform, morphine, chloral hydrate, or magnesium sulphate in the prevention and control of convulsions.

4. With the control of convulsions, clinically, the toxemia subsides. The rôle of nembutal in this complex is now under investigation.

REFERENCES

Group B.—(1) White, married, aged seventeen, para i, gravida iii. Gestation, three months. Self-induced. Died in four days. Autopsy: Septicemia following abortion. (2) White, single, aged sixteen, para 0, gravida i. Gestation, two months. Denied induction. Died in twenty-eight hours. Autopsy: Postabortal sepsis.

Chart 3 includes a list of those patients admitted with a temperature of 100°. It will be noted that the value of "P" is, in both instances, less than one; in other words, there is less than one chance in 100, in both the corrected and uncorrected mortality comparisons, that the difference is due to chance.

In Group A, 3 patients required subsequent interference after intra-uterine débridement on admission, on an average of six days later, while in Group B, 59 patients required operative intervention, averaging 5.4 days after admission.

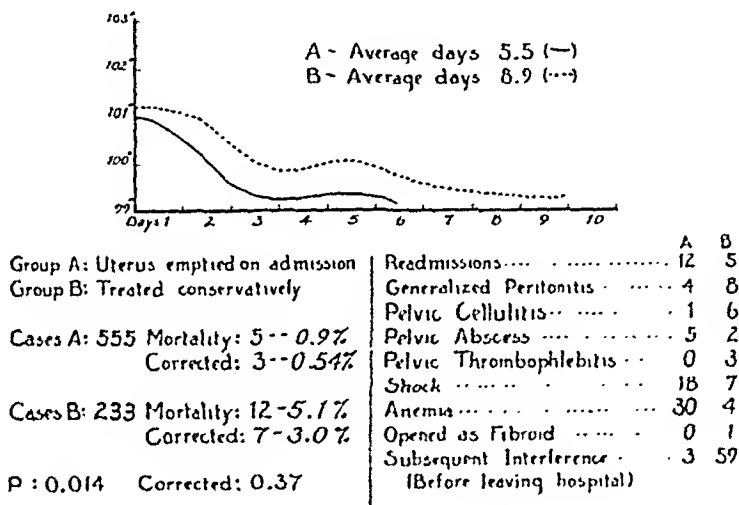


Chart 3.

The dramatic drop in temperature noted by Stewart, who quotes Pearce in this connection, occurred in many of these patients and seems to coincide with the emptying of the uterus, either spontaneously or by operative means.

MORTALITY

Group A.—1. White, single, aged thirty-one, para 0, gravida i. Gestation, three months. Denied induction. Admitted as acute appendicitis on surgical division. Abdomen opened, closed and uterus emptied in operating room. Transferred to gynecologic service and died in six days of acute generalized peritonitis. (Omitted in corrected mortality.)

2. White, married, aged twenty-three, para i, gravida ii. Gestation, 4 months. Denied induction. Uterus emptied on admission, packed. Again, same day, uterus invaded and patient required. Repeated a third time next day. Signed out eighth day; readmitted ten days later with temperature of 102°, and uterus invaded a fourth time. Died on twentieth day from peritonitis and septicemia.

3. White, married, aged thirty-one, para 0, gravida i. Gestation, three months. Denied induction. Entered in shock and did not respond. Died second day. Autopsy: septic abortion; generalized peritonitis.

There were 20.3 mg. of urea, and 131 mg. of glucose in 100 c.c. of blood. The blood glucose was recorded as 83 mg. per 100 c.c. in 1930. Ten per cent phenolsulphonaphthalein was recovered the first hour. Urinalysis of October 8 was negative. The red blood cells numbered 3,650,000, and the leucocytes 10,800, 89 per cent were polymorphonuclear leucocytes and 29 per cent stabs. The temperature, pulse, and respirations varied from 98° to 103° F., 70 to 100, and 20 to 48 per minute, respectively.

A hypodermoclysis of 1,000 c.c. of normal saline was administered October 6, and at 10 A.M. October 9 she received 250 c.c. of 20 per cent glucose in normal saline intravenously.

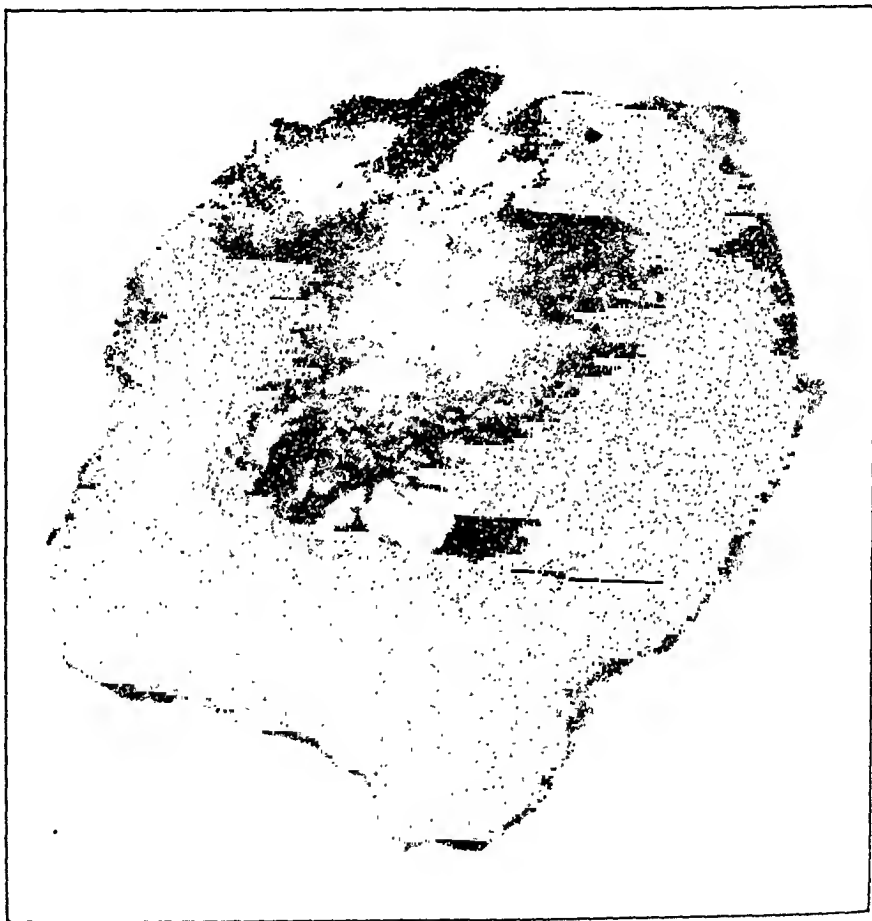


Fig. 2.—X-ray of the dissected bladder. The dark shadows are due to the gas vesicles. The symbol *I* indicates the opened urethra.

Dysuria and incontinence were complained of on October 8, and 250 c.c. of dark-colored urine was obtained by catheter. The patient became moribund and death occurred October 9, at 2:40 P.M.

Autopsy.—The autopsy was performed two and one-half hours after death. The principal pathologic-anatomic findings were: gangrenous appendicitis, peritonitis, subdiaphragmatic abscess, degeneration of the parenchymatous organs, pulmonary congestion, and edema; chronic cholecystitis, diverticulosis of jejunum and colon; cystitis emphysematosa.

Bladder.—The bladder capacity was about 500 c.c. It contained only several cubic centimeters of slightly turbid urine which escaped when it was opened. There were many thin-walled semitransparent cystic elevations scattered throughout the entire

4. White, single, aged twenty-two, para 0, gravida i. Gestation, three months. Induction by physician. Died twenty-two hours after admission. Autopsy: generalized peritonitis. (Omitted in corrected mortality.)

5. White, married, aged thirty-six, para i, gravida iii. Gestation, two months. Denied induction. Died fourth day. Autopsy: septic abortion; generalized peritonitis.

Group B.—1. White, married, aged thirty-two, para vi, gravida vii. Gestation, three months. Denied induction. Treated principally for lobar pneumonia. Died fourth day. Cause of death; lobar pneumonia. (Omitted in corrected mortality.)

2. Negro, married, aged thirty-three, para iv, gravida v. Gestation, three months. Denied induction. Operated first day as ectopic pregnancy. Died third day. Autopsy: septic abortion; generalized peritonitis.

3. White, single, aged thirty-one, para 0, gravida iv. Gestation, three months. Induction by physician. Died ninth day. Autopsy: septic abortion; generalized peritonitis.

4. White, single, aged nineteen, para 0, gravida i. Gestation, two and one-half months. Induction by midwife. Died sixth day. Autopsy: septic abortion; generalized peritonitis.

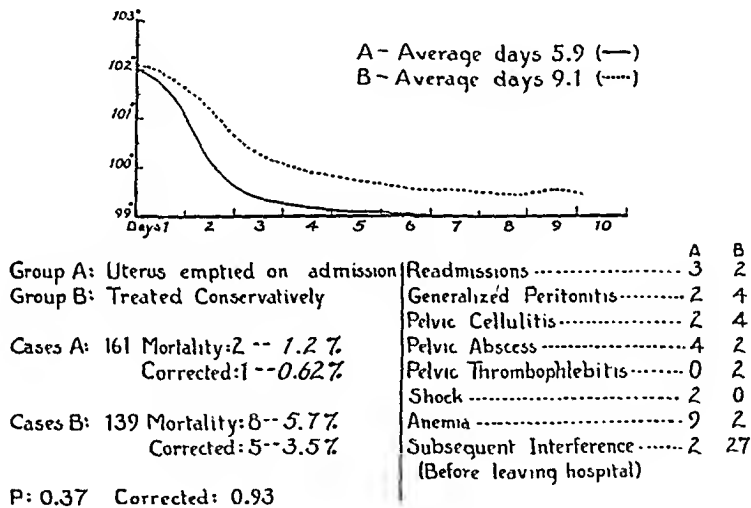


Chart 4.

5. Negro, widow, aged thirty-seven, para ii, gravida iii. Gestation, two and one-half months. Denied induction. Treated principally for pneumonia. Died sixth day. Autopsy: lobar pneumonia. (Omitted in corrected mortality.)

6. Negro, married, aged thirty-seven, para ix, gravida x. Gestation, two and one-half months. Denied induction. Died sixth day. Autopsy: septic abortion, septicemia.

7. Negro, married, aged thirty-seven, para ii, gravida vii. Gestation, two months. Self-induced. Died tenth day. Autopsy: septic abortion, generalized peritonitis.

8. White, married, aged twenty-seven, para ?, gravida ??. Gestation, six weeks. Induced by physician. Died in three hours. Autopsy: septic abortion; generalized peritonitis. (Omitted in corrected mortality.)

9. White, single, aged twenty-two, para ?, gravida ??. Gestation, two months. Induced by physician. Died in three and one-half hours. Autopsy: generalized peritonitis following perforated uterus and sigmoid. (Omitted in corrected mortality.)

10. White, married, aged seventeen, para 0, gravida i. Gestation, three months. Denied induction. Died third day. Autopsy: septic abortion; generalized peritonitis.

The bladder wall measured 0.8 cm. in thickness. Palpation yielded a spongy crepitant sensation. Gas released from the vesicles by puncture was colorless, odorless, and noninflammable. The gas in some vesicles could be expressed into adjacent ones. A few gas vesicles were seen in the deeper layers of the bladder on its cut surface. The distribution, size and number of the vesicles are seen in Figs. 1 and 2. The gas from four of the cysts was withdrawn aseptically and replaced with sterile water which was then withdrawn and cultured aerobically and anaerobically. No organisms grew in these cultures within two weeks.

Postmortem cultures from the spleen were positive for *B. coli* and *B. welchii*. *Streptococcus anhemolyticus* developed in cultures from the abscess on the surface of the liver. Gram-positive cocci and bacilli were found in sections of the wall of the abscess.

Microscopic Examination.—In sections of the bladder the epithelium was desquamated entirely except in the deepest sulci. There was a diffuse infiltration of

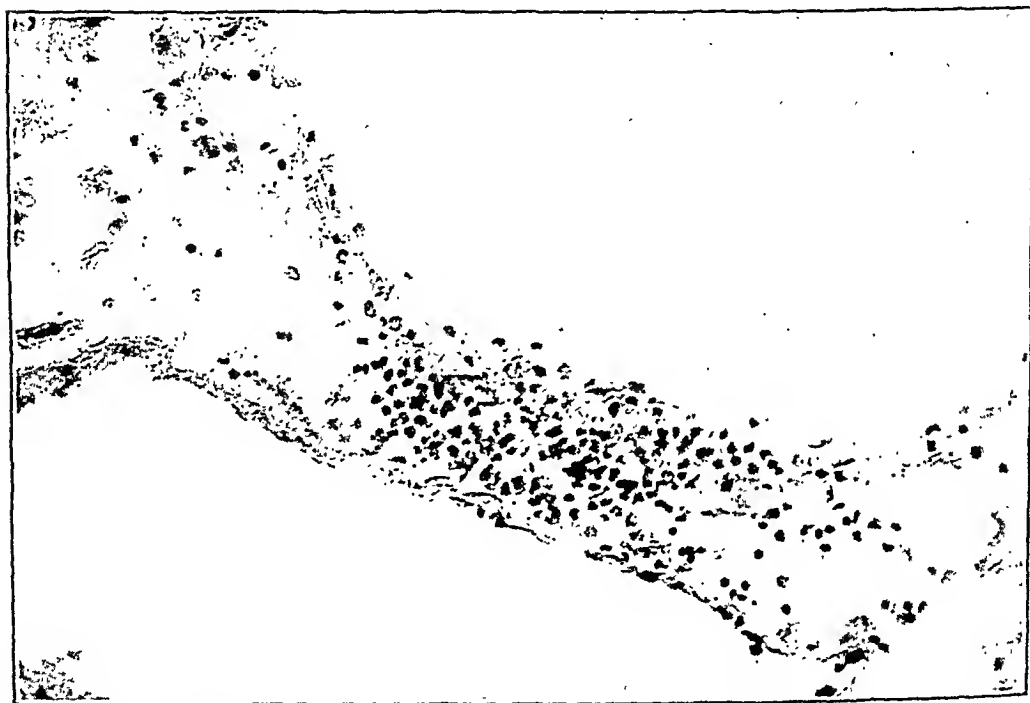


Fig. 5.—Photomicrograph 350 \times of a cyst wall. Note lymphocytes and an occasional polymorphonuclear leucocyte.

lymphocytes, a smaller number of plasma cells and an occasional polymorphonuclear leucocyte into the subepithelial lamina propria. In this there were also a few darkly staining multinucleated giant cells.

Cyst-like spaces were found principally in the lamina propria, but were also present in the muscular layers. Most were ovoid, with a smooth lining, but some were irregular in outline. The most superficial ones were roofed by thin fibrils of connective tissue. Their wall and lining was composed of collagen fibers and in the latter no endothelial cells were seen. A flattened spindle-shaped nucleus, apparently that of connective tissue, was found at the periphery of some of the gas vesicles. There were large collections of red blood cells free in the tissues, focal clusters of lymphocytes and a few plasma cells in relation to some of the cysts.

11. Negro, married, aged thirty-six, para iii, gravida iv. Gestation, three and one-half months. Self-induced. Died forty-fifth day. Autopsy: pelvic abscess; thrombophlebitis, right leg.

12. White, married, aged thirty-four, para ?, gravida ?. Gestation, three months. Denied induction. Died in nineteen hours. Autopsy: septicemia; hemolytic jaundice; thrombophlebitis left ovarian veins. (Omitted in corrected mortality.)

In an effort to correct a source of error that might be found in the fact that some of the patients admitted with high temperatures were considered too sick to subject to any operative procedure and would thus fall in the conservatively treated group, all cases in Chart 3 admitted with a temperature of 101° , or higher, were listed separately and are summarized in Chart 4. In Group A every patient had a temperature of at least 101° , with several as high as 106° , at the time the uterus was emptied with the ovum forceps. Not one complication that could in any way be blamed on the procedure occurred in this group. Again it will be noted that the value of "P" is less than one in both instances. The deaths are detailed under the discussion of Chart 3. In Group A, Nos. 4 and 5; in Group B, Nos. 1, 3, 4, 6, 7, 8, 9, and 11.

CONCLUSIONS

1. There were 92.3 per cent of the patients in this series married and 80.5 per cent had had an average of 2.6 full-term deliveries, apparently indicating the need of wider contraceptive education.

2. Results of treatment of all cases compare favorably as to morbidity and mortality with other recently reported series.

3. Best results were obtained in that group of cases where secundines were removed and drainage established by the method described.

Cotte, G., and Gaté, J.: Three Cases of Persistent Ano-Genital Pruritus Treated Surgically. *Gynécologie* 34: 644, 1935.

The authors report three cases of stubborn anogenital pruritus which they treated surgically. They believe that in elderly women a vulvectomy should be performed, combined with removal of the clitoris and resection of the internal pudic nerves. However, in women who have an active sexual life and in those where the pruritus extends beyond the vulva and involves the anus, the buttocks and the perineum and also in men, resection of the internal pudic nerves may not only not suffice but may result in disturbances in the sexual function. For these cases the authors recommend resection of the pelvic sympathetic plexus and also of the peri-iliac hypogastric sympathetics. If during the laparotomy any abnormalities are found in the uterus or adnexa, these should be treated because there is no doubt that certain cases of pruritus have their origin in reflex hypogastric plexalgia which is due to intrapelvic disturbances or in a plexitis secondary to a pelvic cellulitis.

J. P. GREENHILL.

OBSERVATIONS ON CONCENTRATION OF ANTERIOR PITUITARY-LIKE HORMONE IN THE URINE IN CHORIONEPITHELIOMA, WITH REPORT OF A CASE

JOSEPH M. LINETT, M.D., BROOKLYN, N. Y.

(From the Department of Obstetrics and Gynecology, Kings County Hospital)

IN 1929 Robert Meyer and his assistant Roessler¹ were the first to observe the positive Aschheim-Zondek reaction from the urine of a terminal case of chorionepithelioma. Since then about forty-five cases² of chorionepithelioma have been reported in the literature in which the diagnostic and prognostic value of the test has been demonstrated.

Ehrhardt³ demonstrated 100 mouse units and Robert Meyer 70 mouse units of the anterior pituitary per cubic centimeter of urine in a case of chorionepithelioma. According to Mazer and Edeiken,⁴ the urine of a normally pregnant woman yields about 5 M.U. per c.c. Zondek describes studies in cases of hydatidiform mole, the concentration of the anterior pituitary hormone in the urine of these cases being two to three times greater than in normal pregnancy. Mack and Catherwood⁵ report positive reactions obtained in dilutions 1:10 in chorionepithelioma and in a dilution of 1:5 in a case of mole. Excessive concentration of the hormone in the urine, or a reappearance of it after a negative test had been obtained is strongly suggestive of chorionepithelioma.

The following case will illustrate this assumption and supplement those already cited in the literature.

Mrs. F. S., aged thirty-five years. First admission to Kings County Hospital, June 12, 1933. Chief complaint, vaginal bleeding. Last regular menstrual period occurred Dec. 22, 1932. Patient has had slight vaginal bleeding since March. About fifteen days prior to her admission to the hospital, patient had a severe hemorrhage; she was placed abed. Since then vaginal bleeding was slight. Just before admission patient began to bleed excessively. There was no pain or toxic symptoms.

The family and her past history were irrelevant. Menses began at fourteen years of age, twenty-eight-day type, flow moderate, lasting from three to four days. Patient has three normal children, no previous miscarriages.

Physical Examination.—An obese Italian woman. Head, neck, heart, and lungs normal. On abdominal examination the height of the fundus was suggestive of a six-months' pregnancy. On vaginal examination the cervix was two fingers dilated. Few clots and cysts were found in the vagina. Blood pressure 110/78; R.B.C. 4,064,000; hemoglobin 80 per cent; morphology normal; W.B.C. 9,400; polymorphonuclear 67, small mononuclear 31, large mononuclear 2. Urine negative. A diagnosis of hydatidiform mole was made. On the day of admission patient had severe cramplike pains in the abdomen and passed, by vagina, a large mole. On the following day she was transferred to the gynecologic service. On June 18 the Friedman test was reported negative. On the following day a dilatation and curettage was done. The depth of the uterus was about 9 cm. A small amount of tissue was removed.

VARIATIONS IN GLYCOGEN CONTENT OF THE VAGINAL MUCOSA AS A RELATIVE INDEX TO THE QUANTITATIVE AMOUNT OF OVARIAN HORMONE AVAILABLE IN THE ORGANISM

JOHN F. KRUMM, M.D., CHICAGO, ILL.

(From the Department of Gynecology of Northwestern University Medical School)

THE principle of the "Schiller-Gram test" in the diagnosis of early cervical and vaginal malignancies has opened a most important means of determining the variations in ovarian (or possibly endocrine) function. This test is dependent on a chemical reaction of the iodine in the solution with the glycogen stored in the vaginal mucosa, including that of the portio.

To date a series of observations have been made with this test with some very interesting results. In our experience the normal mucosa of the portio vaginalis and that of the fornices takes the deepest stain indicating a storage of greater amounts of glycogen in these localities. Usually the mucosa of the lower one-half of the vagina takes very little stain or is negative. The mucous membranes in other parts of the body in both the female and male were found to be uniformly negative to this test. For purposes of evaluation and convenience we have classified our positive results as No. 1, No. 2, normal, and exaggerated, depending solely upon the density of the staining reaction.

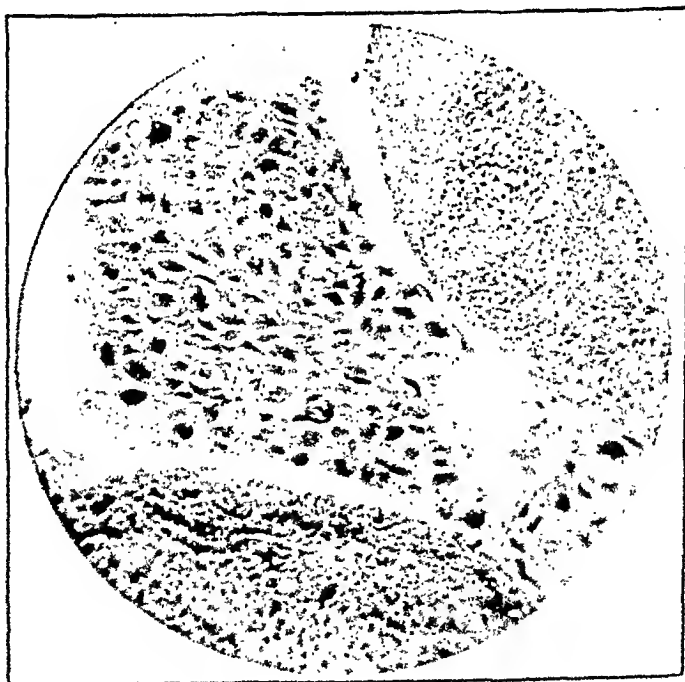
A large series of cases consistently showed a negative or No. 1 reaction, in definite postlimactic patients both physiologic and artificial. In a small series of prepubescent girls the reaction was likewise negative. In cases of so-called "artificial menopause" resulting from operation, the test was variable. Where the ovaries were definitely known to be absent either alone or as a part of a panhysterectomy, the results were invariably negative. In the cases following a supravaginal or total hysterectomy where the ovaries were left intact, our results were variable. Here many patients five to eleven years postoperative showed positive reactions, while others as recent as three to eighteen months following operation showed negative or only No. 1 reactions and were usually accompanied by annoying hot flashes and some noticed an increase in abdominal girth. The former were interpreted as representing cases where ovarian function persisted, while the latter those where the ovaries had degenerated or were degenerating.

At the present time we are attempting to utilize the test as a means of determining the effect of a subtotal or total hysterectomy on the length of viability of the remaining ovary or ovaries. We hope to record

Pathologic report by Dr. Hala. Tissue from uterus. Small pieces of blood clot. Microscopic: The section consisted of blood clot and portion of a tumor, composed largely of Langhans' cells with only occasional syncytial elements present. The



Fig. 2.—Tissue from uterus, atypical proliferation of Langhans' cells and syncytial elements.



Gram's reaction on patients before, and at regular intervals following simple hysterectomies to settle this question which at the present time is greatly contested. Our impression to date suggests that only a small percentage of residual ovaries become inactive within a short space of time, while the majority as shown by positive Gram reactions remain active for many years.

In numerous postelimaetric patients with a negative reaction, it was possible after a number of injections of concentrated follicular hormone, to obtain a normal Gram reaction. This would indicate that the presence of glycogen in the vaginal mucosa is dependent upon the presence of ovarian hormone in the organism. During pregnancy Gram's reaction was found to be a normal positive or exaggerated positive and was variable at different stages in the same individual. In the presence of uterine fibroids the reaction was highly positive. Amenorrhea patients gave variable reactions presumably depending upon the etiologic factor. As stated, amenorrheas of pregnancy were positive, those due to endocrine dyscrasias were negative as a rule, while one case following (intra-uterine) radium was positive. Those associated with constitutional diseases such as tuberculosis, malignancies, diabetes, anemias, etc., showed variable reactions. This group needs further study. Two patients with amenorrhea during lactation, one at nine months, and the other at eleven months postpartum gave negative reactions until the menses were resumed, and then became positive.

In one patient with a severe and persistent *Trichomonas vaginalis*, the vaginitis cleared up spontaneously during the course of a pregnancy only to reappear during lactation. Gram's test was negative during this latter period and even after menses were resumed became only No. 1. Here it appeared that increased ovarian hormone activity was a factor in checking the trichomonads during the pregnancy. Unfortunately we did not have the privilege of trying ovarian hormone therapy in this patient. In a large number of other patients harboring trichomonads, it was noted that Gram's reaction was negative or only mildly positive. As it has often been observed that the trichomonads proliferate greatly after the menstrual flow at a time when the body is very low in ovarian hormone, we attempted to treat these patients with one or more massive doses of follicular hormone in oil, three to five days before the expected menses and with very excellent results. Our results were especially good in preventing recurrences in cases where the trichomonad had apparently been eradicated by ordinary medication only to recur at a later date. Whether the improvement in checking the trichomonads in the presence of increased vaginal mucosa glycogen can be explained on the hypothesis that under these conditions the vaginal flora is returned to normal, we are not in a position to state. However, on the assumption of this hypothesis, it would logically follow that no drugs that would interfere with the

THE EFFECT OF SYMPATHETIC DENERVATION UPON OVULATION AND ESTRUS IN THE RAT*

HENRY G. SCHWARTZ, M.D., AND C. LEE BUXTON, M.D., BOSTON, MASS.

(From the Department of Anatomy, Harvard Medical School)

IN 1929 Cannon and others² found that one female cat conceived when the splanchnic nerves were the only remaining sympathetic fibers; six weeks after extirpation of the splanchnics, normal parturition occurred. Further experiments performed in his laboratory^{1, 5} showed that removal of the abdominal sympathetic trunks had no

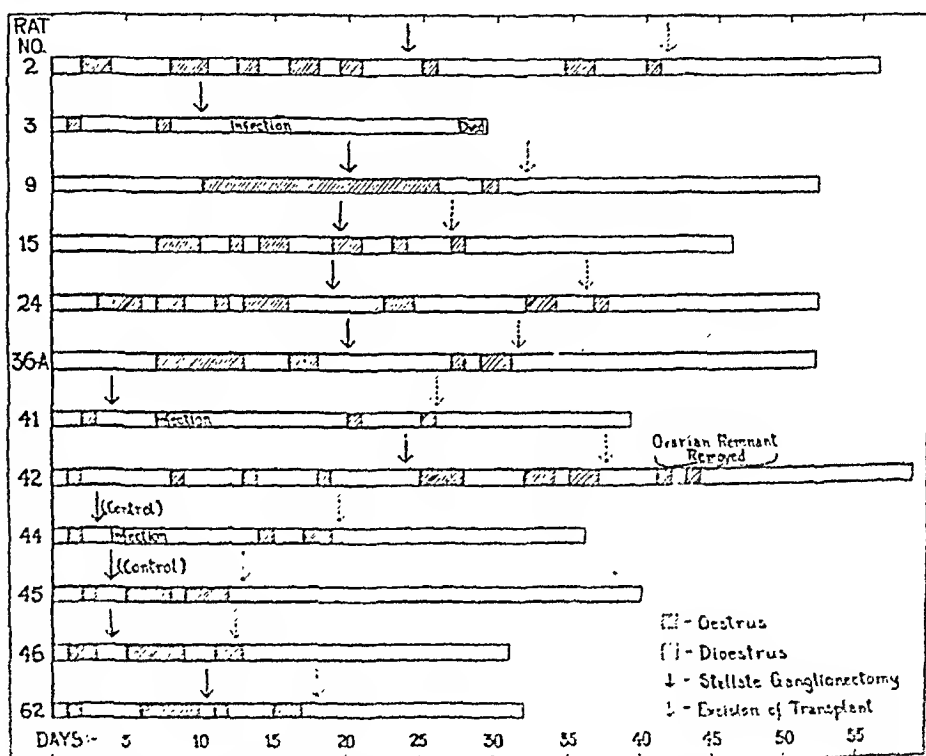


Fig. 1.—Graphic representation of course of estrus and diestrus following oophorectomy and transplantation of ovaries into the antecubital fossa.

noteworthy effect upon the recurrence of the estrous cycle in white rats. These observations were confirmed by Herren and Haterius,³ and nicotinization was reported by Thienes⁴ to have no effect upon ovulation. It was previously found,⁴ in oophorectomized female rats bearing ovarian transplants (in the spleen, mesometrium, and anterior abdominal wall), that estrous cycles occurred soon enough after transplantation, to rule out the establishment of new reflex arcs.

In the present work the authors have attempted to study the problem of neurologic influence upon the estrous cycle by a direct method

*This investigation was financed in part through the generosity of Dr. S. W. H. Brown.

normal vaginal flora (chiefly Döderlein bacilli) should be used locally in the vagina. Or at best antiseptics should be used only temporarily continuing thereafter with only the ovarian hormone.

A positive Gram reaction in a woman who has presumably reached her climacterium because she has ceased flowing indicates that ovarian activity still persists. These are the patients who occasionally become pregnant long after the menstrual flow has stopped.

In cases of hypoplasia with oligomenorrhea the reaction varied from time to time indicating a change in ovarian activity, a positive reaction indicating that a menses was to occur within the near future. In women with suggestive early climacteric symptoms, it is an important confirmation to find a corresponding deficiency in vaginal mucosa glycogen.

Summarizing, we believe that the quantitative glycogen content of the vaginal mucosa is a relative index of ovarian function (or of the presence of ovarian hormone), that the Gram test may be an aid in making a differential diagnosis in cases of amenorrhea, that it suggests in what cases ovarian or other endocrine therapy is indicated, that it is valuable in determining the quantity of hormone necessary to fulfill physiologic requirements, and that it can be utilized as a check on the potency of the commercial hormone products. Further, it offers a means of determining the fate of the ovaries after simple hysterectomies. Finally, it indicates that the persistence of the *Trichomonas vaginalis* is associated with a deficiency of vaginal mucosa glycogen and suggests ovarian hormone therapy as a promising means of combating the recurrence of this parasite.

4753 BROADWAY

Adair, Fred L., and Davis, M. Edward: Chronic Atrophic Dermatitis of the Vulva, Surg. Gynec. Obst. 61: 433, 1935.

The present terminology: kraurosis, leucoplakic vulvitis, leucokraurosis, etc., is confusing and unsatisfactory as it describes only certain phases of this condition. It leads to failure in making a diagnosis of the early stages of the disease prior to the development of the shrinkage of kraurosis, or the white areas of leucoplakia. Chronic atrophic dermatitis of the vulva is a simple and descriptive term for the entire process in its various manifestations.

In a period of five years 23 patients with typical chronic atrophic dermatitis of the vulva have been encountered. Vulvectomy was done in 9 patients with uniformly good results. Various types of treatment were given, including radiation in the majority of the patients, with only temporary relief.

The disease is progressive and does not tend to regress spontaneously, although there may be periods of quiescence.

Surgical removal of the involved tissue is the only safe, logical, and effective treatment in alleviating the symptoms and arresting the progress of the disease.

The condition is to be regarded as a precancerous lesion, with an incidence of carcinoma in over 50 per cent of the cases. Vulvectomy is also justified as a prophylactic measure against carcinoma of the vulva.

WM. C. HENSKE.

vived the operation. As controls, 2 of the original 18 were subjected to the same operative procedure, omitting only the excision of the ganglion.

The results are represented in Fig. 1. In all cases except one (Case 3), the estrous cycle recurred following sympathetic denervation. The excepted animal suffered from a pyogenic infection of the posterior thoracic incision, resulting in lung abscess, inanition and death. This course may account for the absence of cycles. Vaginal smears showed signs of estrus in seven animals within five days after removal of the stellate ganglion; in one (No. 36A) estrus did not occur until the eighth postoperative day; and there was a delay of seventeen days in No. 41. One of the controls (No. 45) went into estrus shortly after the control operation, while the other (No. 44) delayed for twelve days. The tardy appearance of estrus in Nos. 41 and 44 may have been due to slight infection. Following the reappearance of estrus the cycles appeared to be normal, so that we cannot claim any effect of sympathetic denervation.

When the recurrence of normal cycles was established, the ovarian transplants were removed. Subsequently, except for several expected instances of immediate postoperative estrus, cycles were abolished in all the animals except No. 42; in this case it was found that not all of the transplant had been removed. Following extirpation of the small remaining fragment, the cycles abruptly ceased. These results confirm the physiologic activity of the transplants. For a further check, serial sections were made of the excised ovarian tissue. In Fig. 2 are photomicrographs showing the presence of ripe follicles (*a*), freshly ruptured follicles, (*b*), mature corpora lutea (*c*) and old corpora lutea (*d*).

Direct proof of the absence of sympathetic innervation to the arm was obtained after the ganglionectomized animals were killed and necropsied. Under a binocular loupe the right sympathetic chain was dissected from above and below to the site of the operation (stellate ganglion). Grossly, no new sympathetic connections had been made. Histologic study of the scar revealed no sympathetic ganglion cells. Examination of the control rats showed normal stellate ganglia.

CONCLUSIONS

1. A method is presented by which all sympathetic innervation is excluded from transplanted tissue.
2. By the use of this method it is demonstrated that the presence of the sympathetic nervous system is not essential in ovulation and the production of estrus.
3. Ovaries transplanted into the antecubital fossa are shown to be active by physiologic and anatomic criteria.

REFERENCES

SPONTANEOUS RUPTURE OF THE UTERUS

LEO S. SCHWARTZ, M.D., F.A.C.S., AND LAWRENCE KURZROK, M.D.,
BROOKLYN, N. Y.

THE literature reveals over two hundred cases of spontaneous rupture of the gravid uterus. The majority of these cases occurred in multiparas and a few in primiparas. The rupture has been attributed to hyaline degeneration of the uterine muscle, invasion of the muscle by fetal elements and by extensive round-cell infiltration, all of which predispose friability and such uterine musculature cannot withstand contractions during labor.

Appended are the records of three cases of spontaneous rupture of the uterus occurring during labor representing different types of injuries. All of the patients were operated upon with complete recovery. Complication of the operative procedure with eventual good result is seen in the first case.

B. W., aged thirty-seven, white, para ii, was admitted to the Jewish hospital at 2:45 A.M., Feb. 11, 1933. She had her last menstrual period on May 16, 1932 and was due approximately Feb. 25, 1933. She had had a spontaneous abortion of about five weeks' gestation three years before. Her prepartum course was normal. On admission she complained of pains every five minutes and had a bloody show and the cervix was about two fingers dilated. Vertex presented, the fetal heart was in the left lower quadrant and the maternal pulse was good. She was put to bed and at 3 A.M. the membranes ruptured spontaneously with cessation of pains. Falling asleep, she was awakened at 5 A.M. by severe lower abdominal pain and a heavy bloody vaginal discharge. The patient when seen by the resident was cyanotic, cold and clammy; pulse 140 and blood pressure 76/60. The uterus was spastic and three fingers below the ensiform process. Small parts were palpable on the left side and the fetal heart had disappeared. Vaginal examination revealed the cervix three fingers dilated, the placenta on the left side and just within the left edge of the cervical os.

Believing that the condition was that of placenta previa, podalic version was performed and a leg brought down to the vulva. 500 c.c. of 5 per cent glucose solution was given intravenously. The blood pressure was 104/81, red blood cells 2,800,000, and hemoglobin 66 per cent. A catheterized specimen of urine showed occasional red blood cells and many white blood cells. The patient was transfused twice, first 500 c.c. and then 750 c.c. of whole blood given, but only temporary improvement was noted. No further labor occurred, the uterus remaining spastic and tender. With the patient's condition poor and gradually becoming worse a diagnosis of rupture of the uterus was made and operation advised.

At 2 P.M. of the same day the abdomen was opened through a median suprapubic incision; a rupture of the uterus was found, extending along the right border practically to the fundus, dividing the layers of the right broad ligament which contained a blood clot the size of a grapefruit. The abdominal cavity was filled with a large number of clots. Buttocks and back of the fetus protruded through the rent. The uterus was rotated so that the rent lay anteriorly. A cyst of the left ovary the size of a baseball was also found. A six pound twelve ounce stillborn fetus was extracted. A supra-umbilical hysteropelvic hysterectomy was performed, the clots removed and the layers of the right broad ligament sutured. The patient was immediately transfused with 600 c.c. of whole blood and about an equal amount of 5 per cent glucose

with secondary prolapse of the uterus. A right oophorectomy and plication of the round ligament was done. The patient had an uneventful recovery and was discharged from the hospital ten days later.

On Jan. 23, 1935, at the age of forty-one, the menses recurred after an amenorrhea of twenty years. It lasted two days and has recurred regularly at four-week intervals to the present time. The hair is soft now, but no other changes have been noted to the present time.

Fig. 1.



Fig. 2.



Fig. 1.—Low-power magnification of a typical field showing convoluted, elongated or round tubules.

Fig. 2.—High dry magnification showing elongated tubules and scanty and partially hyalinized stroma.

PATHOLOGIC REPORT

Gross Description.—The specimen, received in 10 per cent formalin, was an ovary which measured 6.5 cm. by 4 cm. by 2.8 cm. The surfaces were smooth, gray, and somewhat lobulated. On section through the long axis, four chrome yellow bodies

solution. Length of the operation was thirty-five minutes, ether anesthesia was administered. The patient's general condition improved and pulse was 90 at the completion of the operation. Two cigaret drains were placed in the pelvis.

On the eighth day after operation the patient began to pass urine per vaginam. A retention catheter was inserted, but when removed leakage recurred. Filling the bladder to capacity brought no vaginal leakage, and a diagnosis of ureteral injury was then made. There was no leucocytosis at any time and the highest postoperative temperature reached 103° F. on one occasion on February 27. Vaginal examination about three weeks after operation showed the vaginal vault healing, with a slight induration in the right broad ligament. There was a thin fluid discharge from the vagina. The patient was discharged forty-one days after operation with instructions to return to the hospital.

On May 19, 1933 the patient was readmitted to the hospital because of dribbling of urine from the vagina and because of having experienced several attacks of chills and fever along with pain in the right lower quadrant which radiated to the right side of the back and to the loin. On admission the patient's temperature was 104.6° F. and evidences of a pyelitis were present. Intravenous pyelography at this time revealed normal function of both kidneys. There was a mild right hydronephrosis and the right ureter was dilated along the entire course. The lower half of the right ureter was not visualized, especially at the insertion into the bladder. Cystoscopy showed that the right ureter was obstructed 5 cm. from the bladder. Indigo carmine injection into the circulation was followed by passage of the dye into the vagina. The temperature having returned to normal and the pyelitis cleared up repair of the injury was now deemed to be safe.

The patient was again operated upon June 10, 1933. An extraperitoneal incision in the right iliac fossa was made and the lower half of the right ureter was exposed. Around the lower end there were marked adhesions which were freed. The distal 1½ cm. of the proximal portion of the right ureter was split longitudinally and the free end was introduced into the bladder through a transverse incision and anchored in such a manner that the split cuffs of the ureter were separated transversely and approximated to the bladder mucosa allowing complete patency of the artificial orifice. Right ureteral and bladder catheters were inserted. Cigaret drains were left in the abdominal wound and later removed.

Passage of large quantities of urine followed immediately after the operation. The highest postoperative temperature was 101.8° F. on the second day. Sixteen days after operation the catheters were removed, followed by voidance of urine spontaneously with a slight residual lasting only a few days. Pyelogram done four weeks after operation revealed the right hydronephrosis distinctly less. The insertion of the right ureter into the bladder was external to the normal site. The patient was discharged on the forty-third day after operation with no complaints and repeated checkups have shown her entirely free from symptoms or signs of fistula. Repeated intravenous pyelograms revealed disappearance of the hydronephrosis and the new ureteral opening functioning.

COMMENT

1. On reviewing the history of this case, it is apparent that rupture of the uterus occurred at the time the patient was awakened from her sleep by severe abdominal pain accompanied by vaginal bleeding, at which time the patient went into shock. This was some time prior to the podalic version, and the diagnosis of placenta previa was evidently erroneous.

2. Ureteral injury was sustained because of extreme stretching of the right ureter due to distention of the right broad ligament by blood and clots. This is evident because generally where the ureter is either severed or included in the suture in the course of an abdominal operation the ends retract, often to such an extent that it is

congested and well formed. The supporting stroma was scanty and markedly hyalinized. Within the supporting tissue of the acini, there were single or nests of polyhedral cells which had finely granular, slightly acidophilic cytoplasm and spheroidal and prominent nuclei, containing coarse, darkly stained chromatin granules and one or occasionally two large, heavily stained nucleoli. These cells did not display any particular relation to the blood vessels and morphologically were identical with the interstitial cells seen in the testis.

Fig. 4.

Fig. 5.

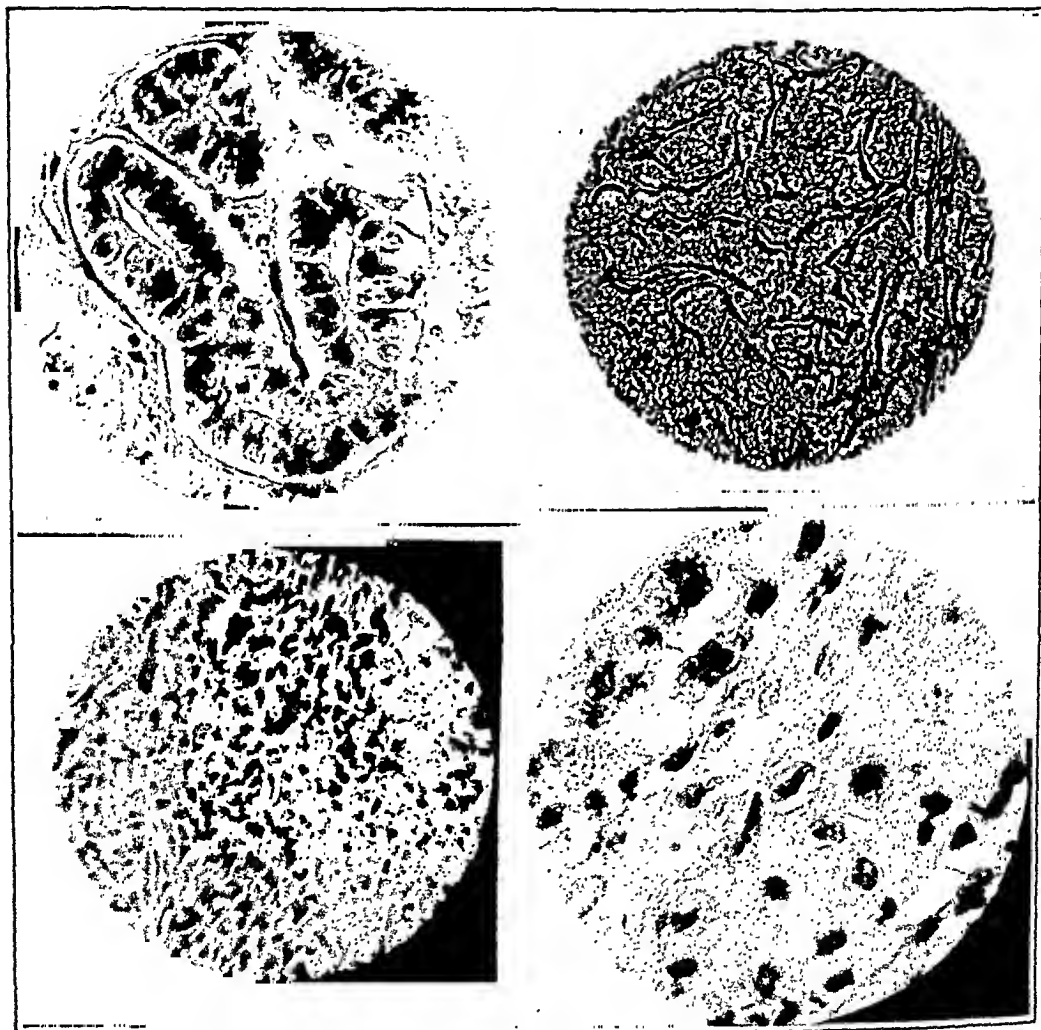


FIG. 6.

FIG. 7.

Fig. 4.—Oil immersion magnification showing the epithelium to be limited by a definite membrana propria.

Fig. 5.—Low-power magnification showing cords resembling the medullary cords of the undifferentiated gonad.

Fig. 6.—High dry magnification of a field showing sarcoma-like structure.

Fig. 7.—Oil immersion magnification of a field showing interstitial cells resembling those of the testis.

Sudan III showed the epithelial and interstitial cells to contain a moderate number of fat globules. Polarized light showed double refracting crystals to be conspicuous in the interstitial cells. The epithelium occasionally reacted positively to this test.

This case illustrates the powerful influence of the hormones produced by the tumor in exerting its defeminizing and masculinizing effects. It is

impossible to reimplant the ureter into the bladder on account of the shortening of the proximal portion which has occurred. In this case it was found after freeing the ureter from the adhesions that the ureter was normal in length.

3. Catheterized specimen of urine before the operation showed the presence of red blood cells.

The second case, M. B., white, aged thirty-four, para iv, was admitted to the Jewish Hospital of Brooklyn Feb. 13, 1934. Last menstrual period was May 16, 1933 and estimated date of confinement was Feb. 23, 1934. The patient had an induced abortion at seven weeks some fourteen months previous and bled for four months intermittently, after which a curettage was done and decidua tissue was obtained.

On admission she had irregular pains and vaginal examination showed the cervix to be elongated, uneffaced, and hard. She was moderately anemic, the hemoglobin during pregnancy being 57 per cent. The fetal heart was irregular, ranging between 62 and 170. No cord was felt in the vagina. Vertex was dipping and the membranes ruptured with meconium-stained discharge. After eight hours of mild labor, the patient suddenly had three strong contractions with bearing down sensation; pulse was 112 and condition fair. Rectal examination revealed no cervix palpable, head was at the spines, and there was slight vaginal bleeding. The fetal heart had disappeared about an hour prior to this time and could not be heard thereafter. During the next hour, the uterus was in moderate tonic contraction, but no distinct labor pains were noted. Examination showed the head almost on the perineum. Pituitrin minims three was given without producing any uterine contractions. An easy low forceps delivery was performed and a stillborn fetus weighing 6 pounds 12 ounces was delivered with two loops of cord wound around the body. The placenta was expelled immediately after the extraction of the fetus, having apparently been separated for some time.

Because of the bleeding, vaginal examination was made and a laceration of the cervix was found on the left side, extending up into the uterus and into the peritoneal cavity with a small piece of omentum protruding into the vagina. As this was repositioned, the patient went into shock; pulse 160 and blood pressure 70/50. Morphine sulphate $\frac{1}{4}$ gr. by hypo and an intravenous injection of 500 c.c. of 10 per cent glucose solution were given with some improvement. The patient was immediately transferred to the operating room and a laparotomy was performed. A rent was found in the uterus, extending along the left lateral aspect from the cervix halfway to the fundus. The cervix was thinned out, the uterine wall was about 4 cm. thick, and the lining of the endometrial cavity was red and shaggy. The entire cervix and canal were discolored, reddish purple, almost gangrenous in appearance. There was considerable extravasation of blood into the broad ligaments and into the peritoneal cavity. A supracervical hysterosalpingo-oophorectomy was performed. The patient was given a transfusion of 750 c.c. of whole blood and reacted very well, blood pressure climbing steadily and pulse dropping. A blood count revealed 2,000,000 red blood cells, hemoglobin 49 per cent, gradually increasing to 4,000,000 cells with hemoglobin 60 per cent. White blood count was normal. The patient made an excellent uneventful recovery with primary healing of the abdominal wound and left the hospital three weeks after the operation.

The third case demonstrates the compression of the lower segment between the presenting part and the bony pelvis. H. S., aged thirty-nine, white, para i, a forceps delivery ten years before and had three miscarriages since. Uterine suspension was done six years prior. The estimated date of delivery was Feb. 20, 1933. The patient was admitted to the Jewish Hospital, Brooklyn, Feb. 15, 1933, labor having begun at 9 p.m. the night before. The blood pressure was 172/95, and slight edema

Stroganoff⁶ attributes the benefit derived from early rupture of membranes in eclampsia to be due to the reduction of absorption of liquor amnii with its extractive substances (supposedly derived from fetal urine) and ferments into the maternal circulation.

Schmidt⁷ believes that on the basis of histologic studies of the amnion, the amniotic fluid is a secretion of the placental amniotic epithelium. Polano and Williams⁸ independently describe vacuoles and fat droplets in some amniotic cells which they believe to be an indication of secretory activity.

As confirmatory of the above theories, I wish to present the following experimental and clinical observations.

The experiments were primarily conducted to find the routes by which substances in the maternal circulation could reach the amniotic fluid and also to find how readily substances in the maternal circulation could reach the fetus.

Experiment 1.—A pregnant guinea pig was injected intracardially with 13 c.c. of methylene blue solution (2.1 per cent). It aborted twelve hours afterward two almost full-term fetuses which on autopsy showed no blue stain whatever. The mother guinea pig survived the experiment and eliminated the dye through the urine.

Experiment 2.—Experiment 1 was repeated with another pregnant guinea pig but with a very concentrated solution (2.1 per cent) of methylene blue. After the injection of 5 c.c. the skin of the extremities, eyelids, and secretion from the genitalia became bluish. On opening the abdomen, the abdominal muscles and peritoneum were not stained. The liver, intestines, kidneys, and bladder were deeply stained. The spleen was stained only in parts but not uniformly. Only the lower part of the uterus near the vagina was stained. The upper part of the uterus, the placenta, the amniotic fluid, and fetuses were free from stain. The heart and neck glands were deeply stained, but not the lungs or brain. The diaphragm was well stained but not the skeletal muscles.

Experiment 3.—Fifteen cubic centimeters of strong carbolfuchsin solution (1 per cent) was injected intracardially into a pregnant guinea pig. The skin and all the abdominal organs, especially the intestines, were well stained. The bladder and the uterus were well stained but not the urine. The reason for this is perhaps that the urine was already there before the injection was made. The heart, liver, lungs, and kidneys were well stained. The skeletal muscles were not as well stained as the organs. The placentas (three) and the placental end of the cords were stained but not the amniotic membranes, amniotic fluid, nor fetuses.

Experiment 4.—Under chloroform anesthesia, methylene blue solution was injected into the uterine artery of a pregnant guinea pig. The uterus and placenta, especially the former, were stained. The organs of the fetus were only slightly stained but not the skin nor amniotic membrane nor amniotic fluid.

Experiment 5.—Carbolfuchsin solution was injected into the placenta. *Result:* The membranes, patches of the skin of the fetus, and part of the fetal intestines became stained but the amniotic fluid remained clear.

Experiment 6.—Methylene blue was injected into the umbilical vein and immediately the skin of the fetus and its organs became deeply stained.

Experiment 7.—Thirty cubic centimeters of methylene blue (2.1 per cent) was injected into the abdominal aorta of a pregnant cat. The placentas, membranes, and the placental end of the umbilical cords of the fetuses became stained. The amniotic fluid was only slightly stained. The skin of the fetuses was stained in patches, in those regions in direct contact with the membranes. The fetal organs including the kidneys were not stained.

Experiment 8.—Under chloroform anesthesia, a pregnant cat was injected with methylene blue into the uterine artery and also into the space between the amnion

A RÉSUMÉ OF 223 CASES OF SURGICAL STERILIZATION*

CLIFFORD B. LULL, M.D., PHILADELPHIA, PA.

A DISCUSSION of the problems involved in the sterilization of human beings brings up so many controversial subjects that I approach my topic with the full realization of these varied angles, and with the intention of not entering too deeply into their discussion.

During the past few years we have had before us continually, because of laws passed in various countries, the very grave and serious problem of sterilization for eugenic or economic reasons. It is not my purpose to discuss this phase of the subject, but one can hardly write of sterilization that this does not come to the front. It is mentioned here because there are a few patients in this series where the economic and eugenic problems unquestionably influenced our decision to perform the operation, not as a primary factor, but secondary to what we considered a medical problem. As there are so many debatable sides to this question at the present time, I feel that, unless one is practicing in a commonwealth where definite statutes can be clearly interpreted as to what constitutes the mental defective or the psychopathic inferior, and until it is definitely settled just what are the constitutional rights of a person living in these days of political upheaval, these problems had better not be pushed too far. When our Supreme Court has difficulty in deciding whether or not the constitution of these United States has been tampered with, and until there is more definite crystallization of opinions on this subject, I can only see many complications arising from enforced mass sterilization. The English legal position, summed up, says sterilization for reasons of health is always lawful; for eugenic reasons, probably unlawful; in lunatics, always unlawful except for health reasons. How much longer it will be before more radical laws will be passed in England, or how soon this issue will be decided in our own country, I do not know; but I believe that the medical profession must enter into the discussion of these problems more actively and take a definite stand in these matters. Therefore, that which confronts those of us practicing obstetrics and gynecology in a commonwealth where there are no laws as far as eugenic sterilization is concerned, is the problem of relieving suffering individuals or prolonging their lives, where in our opinion a continuation of childbearing would be harmful. This is particularly true in the more ignorant type of patient, because on several occasions I have found permission for the operation signed by the patient and hus-

*Read by invitation at a meeting of the New York Obstetrical Society, May 14, 1935.

Observation 2.—Pressing the bladder region of a five months' fetus miscarried by A. R. on Aug. 20, 1929, elicited the passage of a few drops of urine.

Zangemeister and Meissl² also mention having been able to express urine from a five months' miscarried fetus.

COMMENT

The results obtained from Experiments 1, 2, 3, 4, and 5 on guinea pigs show that because of the small caliber of the blood vessels, the stain does not readily pass through the placenta into the fetus or to the amniotic fluid.

Experiment 6 shows the ready staining of the fetus when the placenta and membranes do not constitute a barrier. The result of Experiments 7 and 8 where the larger blood vessels of the cat have been used, shows that the dye passes from the maternal circulation into the fetus through the placenta and into the amniotic fluid through the placenta and the amniotic membrane. Apparently, it shows the amniotic fluid to come from the maternal circulation through the intervention of the amniotic membrane. Since the amniotic membrane in relation to the placenta comes in contact with blood vessels larger than those in contact with the atrophied decidua capsularis, it is presumed that most of the fluid from the maternal circulation comes from that portion in immediate contact with the placenta.

The result obtained from the above experiment and the cited clinical observations fit in with the chemical examination of the amniotic fluid made by the above cited investigators who state that though the amniotic fluid may originally come from the placental circulation through the intermediation of the amnion, it must be increasingly admixed with fetal urine after the full development of the kidneys.

Clinical observations showing either scanty amniotic fluid or the retention of urine due to absent urethra, and the unmistakable proof that fetal urine is excreted as early as the fifth month if not earlier, conclusively prove that though the amniotic fluid may originally come from the placental circulation through the intermediation of the amnion, it must be increasingly admixed with fetal urine after the full development of the kidneys.

The increase of the amniotic fluid as the age of pregnancy advances after the fourth month is due not only to the larger circulation in the placenta but also to the added amount of fetal urine which is excreted into it.

That the amniotic fluid is not static but becomes changed through the maternal circulation is shown by the investigations of Albano³ who after injecting into the amnion 6 mm. of sodium-phenol sulph-naphthylsulfate noticed its gradual disappearance until the end of forty-eight hours. He believes the liquor amnii is renewed every 14.31 hours.

nations are due to the presence of the Sex in society—not in the Zenana! Do you not perceive that Music, Poetry, Painting, all the arts of elegance: Luxury, Fashion (that potent spell!), are of her, and through her, and to her? Versailles and Marli, and the Trianons, had never been built for men. The loom blends and sets forth the dyes that add richer reflections to her bloom; the wheel flies for polishing the diamond that is to flash in impotent rivalry above her eyes; sea and land are ransacked of their treasures for her; and the very air yields its egrets, and marabouts, and paradise birds, that they may add piquancy to her style, and grace to her gesture. Even literature and the sciences are in a good measure due to her patronage and approbation, which is the motive power to all manly endeavor. This is true, since, but for her approving smile, and her rewarding caress, what is there should stir man from the sole, the dire, unremitted compulsion to act that he may live? With woman for his companion, he acts not only that he may live, but that he may live like a Christian and like a Gentleman.”

A sage has told us that men are more like their times than their fathers and the life of this man bears out this contention. Although Meigs was rooted deeply in sober New England it was in the romantic South that he spent his formative years. His father, Josiah Meigs of Middletown, Connecticut, was the sixth generation from Vincent Meigs of Dorsetshire who emigrated to East Guilford, Connecticut, about 1647. The Meigs family were farmers in that region and the name is today remembered in Meigs' Point, a beautiful promontory bordering the Hammonasset River as it enters Long Island Sound. His mother was Clara Benjamin of Stratford. Her brother Charles Delucena Benjamin was named after a Spanish gentleman to whom the father had become strongly attached during the Revolution, and it was from this uncle that Charles D. Meigs was named.

Josiah Meigs was educated at Yale and after his marriage in 1790 removed to St. George's in Bermuda where he practiced as a proctor in the Admiralty Courts. It was on this island on Feb. 19, 1792, that Charles Delucena Meigs was born. Four years later the family removed to New Haven where the father was elected Professor of Mathematics and Natural Philosophy in Yale College. When Charles was eight years old the father was called to the presidency of the University of Georgia and the family removed to Athens in that state. Here the boy grew up and among his boyhood experiences may be mentioned his visit among the Indians for a month as a guest of the Cherokee Nation. In 1809 Meigs graduated from the University of Georgia and shortly after was apprenticed in medicine to Dr. Thomas H. M. Fendall of Augusta. From 1812 to 1815 he took two courses in the University of Pennsylvania, taking his degree in 1817. After the first course he

VAGINAL HERNIA OF DOUGLAS' CULDESAC

R. J. STEARNS, M.D., OMAHA, NEB.

(From the Department of Gynecology, University of Nebraska College of Medicine)

THE literature dealing with true vaginal hernia of the posterior culdesac is not very abundant, even though it has been recognized and discussed for the past two hundred years by some twenty different men. In 1887, Etheridge⁷ reported on the subject, then nothing was written for about twenty-six years, when Lothrop⁸ gave quite an extensive review of the literature. Since that time a case has been reported every two to four years, the last ones by W. T. Black² and J. H. Dew.⁶

The terms used to describe this condition are many; such as, vaginal enterocele, posterior vaginal enterocele, culdesac hernia, Douglas pouch hernia, posterior vaginal hernia, high rectocele, hernia of Douglas, perineal hernia, vaginolabial hernia, and pelvic hernia. I think the most descriptive term is vaginal hernia of Douglas's culdesac, since it is a peritoneal sac pushed through an opening in the pelvic floor which presents as a bulging mass into some portion of the vagina.

Most textbooks on gynecology at least mention this condition, but with the exception of Kelly, they give no adequate description of it. The article in Kelly's *Gynecology* by G. G. Ward¹⁸ is very complete with some very good illustrations of the condition.

There are several types depending upon the point of exit through the pelvic floor. These points of exit may be anterior, as between the bladder and the uterus, lateral to the uterus, or the most common, posterior, as between the rectum and the posterior wall of the vagina.

The cause is probably a congenital weakness of the pelvic floor at this point associated with the strain of pregnancy and labor. The large majority of the cases cited in the literature have had one or more confinements. The conditions most often confused with this type of hernia are rectocele, cystocele, and uterine prolapse.

It is not always easy to diagnose these hernias as there may be no other symptoms than those associated with pelvic relaxation with the protrusion of either vaginal wall. At times the protrusion may change with respiration and entirely disappear upon reclining, the sac may contain coils of intestine in which the peristalsis may be elicited. The diagnosis is usually made not from any marked symptoms on the part of the patient that are due directly to this hernia; but in the course of an examination for some associated condition, such as uterine prolapse or a rectocele, this unusual bulging of the vagina is found. In some instances it is discovered following a perineal repair with a return of the apparent prolapse of the posterior vaginal wall or rectum, and on close examination it is found that the recurrent herniation is high up on the posterior vaginal wall.

The cure of this condition is, of course, a surgical one. There are several methods of operative procedure: Vaginal, abdominal, and the combined vaginal and abdominal method of approach. In the two cases I wish to report the patients were both operated upon by the vaginal route.

CASE 1.—Mrs. W., University Hospital No. 49583, aged fifty-one, gravida iii. fifteen years ago the last child was born, all quite normal labors. She went through the menopause at forty eight.

states in one of his manuscript lectures that he "then went home to set up for myself and practice on that stock in trade. I was still lamentably ignorant of all save some methods. I was twenty-one years of age and assumed to be a physician!! Everybody called me Doctor; I thought so myself." In 1815 Meigs married Mary, the daughter of William Montgomery, a merchant of Philadelphia, and set up in practice in Augusta, Georgia. After a year and a half he removed to Philadelphia and although practice was slow at first he soon became intimate with the medical leaders there who recognized his ability as an independent thinker. He was one of the first editors of the *North American Medical and Surgical Journal*. In 1831 he translated and published Velpeau's *Elementary Treatise on Midwifery* which he dedicated to Thomas Chalkley James. His first independent work was entitled *The Philadelphia Practice of Midwifery*. In 1837 he was appointed by the College of Physicians with Drs. Gerhard, Houston and Ruan to act with a committee of trustees of the estate of Dr. Jonas Preston which resulted in the founding of the "Preston Retreat."

In 1841 at the time of the reorganization of the Jefferson Medical College Meigs was elected to the post of Professor of Obstetrics and the Diseases of Women and Children. Among his faculty associates were Franklin Bache, John K. Mitchell, Thomas D. Mütter, Joseph Panoast, Robert M. Huston and Robley Dunglison. From this time Charles D. Meigs came into his own as one of the most popular and influential medical teachers of his generation. In addition to his extremely busy obstetric and medical practice he took time to publish many medical works chiefly on obstetric subjects. He also took up a serious study of German and was thus able to bring to his field the work of the most important German obstetricians. His dramatic style of lecturing made him famous as an orator and among his public addresses is a notable one on *The Augustan Age* which was published in 1841. His son wrote of him that "perhaps the most remarkable feature of his life was his wonderful activity. He was never idle. I never knew him to go to bed without a book in his hand." The same authority says that in the garret of their home was maintained a most complete workshop with carpenter's bench, lathe, furnace, etc., where the father worked in metal and wood. He also expressed his artistic abilities in painting and modeling.

Among Meigs' best known publications are *Woman, Her Diseases and Remedies*, 1847, *Obstetrics, the Science and Art*, 1849, *Treatise on Acute and Chronic Diseases of the Neck of the Uterus*, 1854 (excellently illustrated with colored lithographs from drawings by the author) and *Memoir on the Reproduction of the Opossum*, 1847. This latter monograph illustrates in a fine way the scientific mind of the author through a series of careful experiments and observations carried out with all the completeness and accuracy that true research demands.

was done on the cervix. Fig. 2 is a drawing made at the time of operation which demonstrates the anatomic relation of the hernial sac. There resulted a firm perineum with no vaginal protrusion.

Patient died from an embolus of the femoral artery three months later. It was most unfortunate that at the autopsy no examination of these structures was carried out, since only one case of vaginal hernia has been reported at autopsy.

CASE 2.—Mrs. P., University Hospital No. 49544, aged fifty-six, gravida v, sixteen years ago the last child was born, all quite normal labors. Menopause at fifty-two years.

Ten years ago she had a sensation of dragging down in the pelvis. Seven years ago she fell off a five-foot ladder, and about this time she first noticed some bulging in the vagina. This gradually increased in size and during the year became

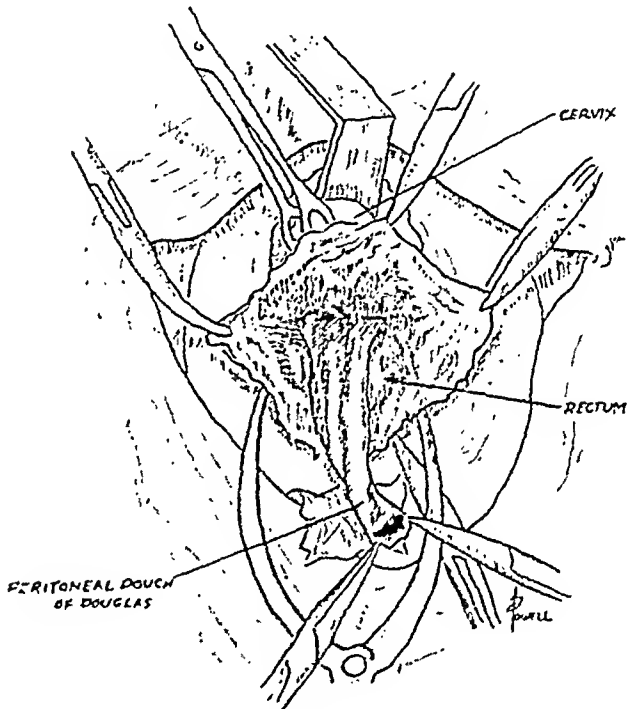


Fig. 2.—Enterocele operation.

much worse, particularly in walking and running a sewing machine so that she had to stop work. The tumor would disappear on lying down. The past year it was hard for her to hold her urine for any length of time.

Among other scientific achievements should be mentioned his recognition of cardiac thrombosis as a cause of sudden death in labor. In speaking of this observation Gaillard Thomas writes "It has been remarked that Meigs just escaped the honor which is now and will be hereafter given to Virchow for a great pathological discovery." In 1845 Meigs visited Europe and while in Paris presented a paper on Cyanosis before the Academy of Medicine.

It seems not unlikely that the extraordinary activity which characterized Meigs' life should have eventually worn him down. In 1856 at the age of sixty-four he suffered an attack of nervous exhaustion. He realized the cause, however, and immediately set about changing his way of living. He bought 38 acres of land in Delaware County and built a country home complete with barns, workshop and equipment for carrying on farming on a small scale. He named this place Hammonassett after the region in Connecticut where his forefathers had settled. Soon after this adventure, his health very much improved but following his course at Jefferson in 1859-60 he sent in his resignation to the faculty. In commenting on this act he wrote in his garden record, "This afternoon I delivered my last lecture at the Jefferson Medical College and shall never more appear in public as a teacher of obstetricy, though I am to go on Wednesday at 4 P.M. to deliver an address of farewell to the class. I am surprised that this finale of my public life causes in me not the slightest excitement; I am simply very glad to get out of it. I am not mad with joy but am serenely cheerful at the prospect now before me of enjoying a little of the *libre arbitre* that I never yet did know."

Meigs spent his remaining years chiefly at the farm, only occasionally seeing patients in consultation. A biographer tells us "The doctor's robe cast off, he donned that of the bibliophile." These years we may believe were essentially pleasant ones and his son has given to us this description of his library which also tells us much of the man. "He had crowded together a vast mass of knowledge, of which the disorder in his library was symbolical. This was a very paradise of confusion, and the spirit of disorder there ruled over all. Here were three bookcases, whose arrangement was like that of the night before the creation. There was an Italian Bible of the sixteenth century almost squeezed to death between two fat volumes of obstetrics; and of the complete works of Cicero there were generally two or three volumes on a piano stool for the children to sit on. The mantelpiece was in a yet more uncultivated state than the bookshelves. The centerpiece was commonly a tin canister of hunkodora tobaceo, looming up from a waste of empty match boxes, two or three half-finished busts of General Grant, and some scissors for pruning the trees, all of which had a tendency to be brought together by the lumps of beeswax that were scattered about. From this disordered wilk, lying on a

hospital on Aug. 14, 1934, with the history that labor pains had occurred one week before but had subsided and that the membranes had ruptured three days before admission.

Her temperature was 100.2° F. and pulse 100 at the time of my first examination and she had had three chills. Her tongue was heavily coated and her breath foul. The uterus extended to the ensiform, was of boardlike rigidity, and the lower uterine segment and both adnexal regions were exquisitely tender to even light palpation. There was a foul-smelling, profuse, yellowish green vaginal discharge. On rectal examination the cervix was found rigid, one-third effaced and the os was dilated to 1 cm. No presenting part could be outlined.

Supportive treatment was instituted and a diagnosis of antepartum sepsis was made.

After a labor of thirteen hours she was delivered of a stillborn male fetus, weighing 9 pounds and showing beginning maceration. A large amount of foul-smelling liquid of pea-soup consistency escaped from the uterus at the beginning of the third stage. Cultures from the uterus showed a bacillus of the colon group and *Staphylococcus albus*, *pyogenes*.

Her postpartum condition was not satisfactory. On the second postpartum day her temperature reached 104° F. Elliott treatment was started on the third postpartum day and on the fourth postpartum day she was given a transfusion of 300 c.c. of citrated blood.

Three striking changes occurred in this patient after Elliott treatments were started: (1) The abdominal distention and tenderness subsided rapidly. (2) The lochia became profuse and at first was very foul but after four days of treatment it became normal in amount and the foul odor disappeared. (3) The temperature never went above 100° F. The patient was discharged on her sixteenth postpartum day. At her final examination, three months after delivery, I found involution good, no parametrial thickening or tenderness and, aside from old cervical and perineal lacerations which will require surgery at a later date, her pelvic organs were in good condition.

Her blood culture, taken on admission to the hospital, was negative at the end of two weeks. On admission her sedimentation rate was 80 per cent in the first hour. Her blood Wassermann was negative. The urine at one time showed pus and blood and albumin, Grade 2, but this quickly returned to normal.

She received a total of ten Elliott treatments.

CASE 2.—St. Michael's Hospital, 33387. Mrs. W. S., white, aged thirty years, gravida vi, para v, was admitted on Nov. 10, 1934, with the following history: She was approximately at term when, on Nov. 5, 1934, the membranes ruptured spontaneously while she was at home. No pains occurred until the afternoon of Nov. 7, 1934, and no physician was called to attend her until 10 p.m. on Nov. 7, 1934. At that time her physician found her temperature to be 100.6°, and pulse 114. Dilatation was 10 cm. and the face was presenting. She delivered a stillborn female fetus weighing 10 pounds at 12:10 a.m. on Nov. 8, 1934, after her physician had corrected the face presentation. The placenta was delivered by Credé expression ten minutes later, and it was complete. One hour later her physician reported her temperature 103° and pulse 128. She ran a septic course from that time until her admission to the hospital. She had two chills on November 7 and 9 and one chill, which lasted for fifteen minutes, the morning of November 10. Her maximum temperature, prior to admission, was 105.6° F.

cushion, which the dogs had almost torn to pieces, and with Humboldt's *Cosmos* staring him in the face, he was wont to declaim to his grandchildren upon the incalculable advantages of order, and the keen pleasure it gave him to see everything in its place."

On the twenty-second of June, 1869, at the age of 77, Charles Delucena Meigs died.

Having briefly reviewed his life, let us try to approach some understanding of Meigs' antagonistic attitude toward anesthesia in childbirth, the transmissibility of puerperal fever, and the operation of ovariectomy. We may expect that a man of his forceful nature would hold strong opinions. A search into his writings reveals the positiveness with which he stated these views. In the early days of anesthesia it is not difficult to imagine the lack of skill with which it was probably administered. Meigs' opposition to its use in obstetrics was chiefly based on its dangers and his biographer John Bell states that this opinion was common with the majority of practitioners in Philadelphia. Meigs' opposition to chloroform he states "was certainly not without reason when scarcely a week passes but we hear a death from chloroform." Meigs further opposed anesthesia on the ground that it lessened or stopped labor pains and therefore was contrary to normal physiology, an indictment which at that time was probably true in many instances.

On the subject of puerperal fever Meigs made an exhaustive study. He was particularly impressed with the value of Gordon's pioneer work. In his *History, Pathology and Treatment of Puerperal Fever* he writes, "Dr. Gordon's volume . . . has so convincing and truthful an air in every page and line that I cannot imagine anything more fitted to impress the mind of a reader with the warm and irresistible convictions of the author." Meigs' work on this subject was a republication of the essays of Alexander Gordon, William Hey, John Armstrong and Robert Lee. Both Gordon and Armstrong were convinced of the infectiousness of the malady while Hey and Lee, though not as positive in their assertions, recommended using all precautions for its prevention preferring thereby to be on the safe side. In spite of these doctrines which Meigs himself had edited, it is somewhat amazing to find him stating his opinion that "Should the student ask me how to explain the curious occurrence of cases in the practice of one medical gentleman, while his neighbor meets with no such cases, I cannot account to him for so great a mystery; one which evinces rather a strange coincidence of accidents, than a peripatetic causation by the doctor. I prefer to attribute them to accident, or Providence, of which I can form a conception, rather than to a contagion of which I cannot form any clear idea, at least as to this particular malady." And again, "if my exposition of the doctrine of this contagion . . . is in-

ergot, quinine, and pituitrin. A high carbohydrate diet was employed. Bowel stasis was treated solely by mineral oil by mouth and tap water enemas when necessary.

On theoretical grounds, one might hesitate to employ Elliott treatment in patients of this type because of the danger of hemorrhage. Hemorrhage did not occur. The marked increase in the lochia in each case after Elliott treatments were started was accompanied by a rapid decrease in the size of the uterus without exception. This seemed to me to be a logical accompaniment of the pelvic hyperemia produced.

The analgesic effect of the Elliott treatments was marked in all three patients. All of them were apprehensive when the first treatments were started and it required a little tactful and patient reassurance to gain their confidence but, after the first treatment, each patient expressed herself as pleased with the relief from pain and tenderness which she experienced. It was a very common thing to have the patients sleep through subsequent treatments. No analgesic drugs were required after Elliott treatments had been instituted except for an occasional dose of codeine.

PERSONAL RECORD OF HYSTERECTOMIES PERFORMED DURING A PERIOD OF FIVE YEARS*

HERMANN GRAB, M.D., F.A.C.S., New York, N. Y.

DR. REUBEN PETERSON, in discussing the risk of operation in gynecologic cases, states that "Today it is not sufficient merely to examine the urine of a patient to determine whether or not it is safe to operate . . . failure to detect serious diseases of the lungs, heart, liver, and kidneys may result in postoperative deaths."

The operative risk in any case may depend upon many factors: pathologic conditions that call for operative procedure, complications and technical difficulties of the operation, the various organs involved, the physiologic condition of the heart, circulatory and endocrine systems, and other organs. The effect of anesthesia must also be taken into consideration.

At the Woman's Hospital all patients who enter for operation have a thorough physical examination, which includes nose, throat, and teeth, and if necessary, the eyes. The heart and lungs are checked up, as well as the blood pressure. The height and weight are recorded. The laboratory check-up on the urine and blood sedimentation rate, if requested. Smears are taken from the genitourinary tract if needed. Secondary anemias are treated by direct blood transfusions. If the sedimentation test is fast the case is further studied for the possible cause of the same. Consultations are freely held between the members of the staff. The diagnosis, as well as the opinions about the risk of operation of the various consultants are recorded.

sufficient to bring the reader over to my way of thinking, I at least can never convince him, and must be content forever to let him alone in his fantasy." We recognize in such statements Meigs as an indomitable fighter for what he considered the truth but it is difficult from our viewpoint to see how he could have gone so far astray.

Meigs was against the employment of ovariectomy for any reason, stating that "no urgent, imminent and definite necessity can ever be supposed of an ovariectomy operation," and also, "I am opposed then to the operation of ovariectomy, and I am opposed to it on the grounds of objection I consider valid against all surgery that is not unavoidable." Meigs certainly had some ground at least for his opinion concerning this procedure and based his argument chiefly on Lee's statistics of all known operations of ovariectomy from 1809 to 1846, which reported 118 cases with 40 fatalities. We may come to the conclusion honestly, I think, that there was some justification for the attitude of Meigs toward anesthesia and ovariectomy. With regard to puerperal infection his was one of those mistakes which is nothing short of disaster. The evil which he unconsciously did lives after him so that in the light of present-day knowledge it is somewhat difficult to appraise his usefulness. However, in spite of his errors Charles Delucena Meigs stands out as a brilliant and stimulating personality, who unquestionably elevated the standards of teaching and practice of obstetrics in America. He was indeed a great leader in medicine and those who came under his influence were better men for that contact. His life in the standards of his day was an eminently successful one and we can truthfully think of his career ending, as described of old,

"in a full age,
Like as a shock of corn cometh in, in his season."

REFERENCES

Bost. M. Surg. J. 40: 106, 334, 1849. Bost. M. Surg. J. 39: 465, 1849. *Kelly and Burrage*: American Medical Biographies, Baltimore, 1920. *Meigs, C. D.*: A Treatise on Acute and Chronic Diseases of the Neck of the Uterus, Philadelphia, 1854. *Meigs, C. D.*: Women and Their Diseases—A Series of Letters to His Class, Philadelphia, 1848. *Meigs, C. D.*: Memoir on the Reproduction of the Opossum, Philadelphia, 1847. *Meigs, C. D.*: Obstetrics, the Science and the Art, Philadelphia, 1849. *Meigs, C. D.*: The Augustan Age, Philadelphia, 1841. *Meigs, C. D.*: The History, Pathology and Treatment of Puerperal Fever, Philadelphia, 1842. *Meigs, C. D.*: Woman and Her Diseases and Remedies, Philadelphia, 1859. Transactions, College of Physicians, Philadelphia 4: n.s., 1863-74. *Williams, S. T.*: The American Spirit in Letters, London, 1926.

TABLE I

First year		49 cases
Second year		42 cases
Third year		42 cases
Fourth year		51 cases
Fifth year		62 cases
Total		246 cases
Private cases	180	73.2 per cent
Ward cases	66	26.8 per cent
Youngest patient		23 years
Oldest patient		56 years
Model age		40 years

TABLE II

Unmarried	20 cases	8.1 per cent
Married	226 cases	91.9 per cent
Conceived	162 cases	71.6 per cent

Among the complete hysterectomies there was one death, 1.9 per cent, among the supravaginal hysterectomies (195 cases) there were three deaths, 1.5 per cent.

TABLE III. WOUND HEALING

Primary union	222 cases	90.3 per cent
Slight disturbance but no suppuration	10 cases	4.1 per cent
Slight suppuration	3 cases	1.2 per cent
Considerable breaking down	7 cases	2.8 per cent
Died	4 cases	1.6 per cent
Recovered without complication	200 cases	85.4 per cent

Both tubes and ovaries were removed in 114 cases, 4.6 per cent, one tube and ovary removed in 109 cases, 44.3 per cent, both tubes and ovaries remaining in 23 cases, 9.3 per cent.

Three of these patients died of acute general peritonitis and one died of lobar pneumonia, confirmed by autopsy. In every one of these cases there was pus present at the time of operation. The presence of pus in itself is not of much significance. We have all seen pus cases where the smoothest possible recovery follows the operation. In all these patients that recovered so smoothly with the presence of pus, we must presume that there was an organism present with attenuated virulence, or that the resistance of the patient was such as to overcome the onslaught of the organism.

During a second five-year period I performed 262 hysterectomies among which there were six fatalities, a mortality rate of 2.2 per cent. This seems a favorable mortality rate considering that both Peterson¹ and Burch² in their experience noted a mortality rate of 4.5 per cent.

REFERENCES

- (1) J. A. M. A. 92: 1907, 1929. (2) AM. J. OBST. & GYNEC. 21: 794, 1931.
225 CENTRAL PARK WEST

Society Transactions

OBSTETRICAL SOCIETY OF PHILADELPHIA

MEETING OF DECEMBER 5, 1935

The following papers were presented:

Trichomonas Vaginalis Vaginitis. Dr. Helen M. Angelucci. (For original article see page 1020.)

Further End-Results in the Treatment of Carcinoma of the Cervix. Drs. Lewis C. Scheffey and William J. Thudium. (For original article see page 946.)

The Immediate and the Remote Effect of Abdominal Cesarean Section. Dr. Thaddeus L. Montgomery. (For original article see page 968.)

Item

American Board of Obstetrics and Gynecology

The results of the 1936 examinations given applicants for certification by the American Board of Obstetrics and Gynecology are as follows:

A total of 91 applications were considered this year. Of this number, 10 were rejected or voluntarily withdrawn, and of the 81 examined, 22 were failed or conditioned, and 59 were approved for certification.

The names of the 59 successful candidates were announced at the annual dinner for diplomates of this Board and their friends held at the Hotel Kansas Citian, Kansas City, Missouri, on May 13, 1936, terminating the two-day examination period just prior to the opening of the Scientific Session of the A. M. A. annual convention.

Secretary, Dr. Paul Titus, 1015 Highland Building, Pittsburgh (6), Pennsylvania.

Erratum

A paper entitled "Neonatal Mortality" by Dr. Cornelius T. O'Connor, of Boston, Mass., published in the May issue of the JOURNAL (p. 872), was described in a footnote as having been presented as a thesis for admission to Fellowship in the American Association of Obstetricians, Gynecologists and Abdominal Surgeons, at the annual meeting of this organization in September, 1936. This designation was due to a clerical error which was not noted in the reading of the proof. The article in question was submitted as an original contribution and not as an admission thesis to the Association.

The device has been used only once, but the experience was so promising that it is described so that others may utilize it. A detailed protocol of the particular case follows:

L. H., a septigravida, aged thirty-four years, Hospital Number K 11,821, was admitted to the University Hospital May 4, 1935, in the ninth lunar month of pregnancy. The first six pregnancies and labors were normal except that one child was born prematurely. The present pregnancy was also normal. On May 10, 1935, the bag of waters ruptured spontaneously, although only a small quantity of fluid escaped. During the following two days the patient complained of cramping pains in the lower abdomen and back and insisted she was in labor, even though repeated rectal examinations showed only 1 cm. dilatation of the os. At 11:30 A.M., May 13, 1935, sixty-five hours after spontaneous rupture of membranes, the patient noticed something

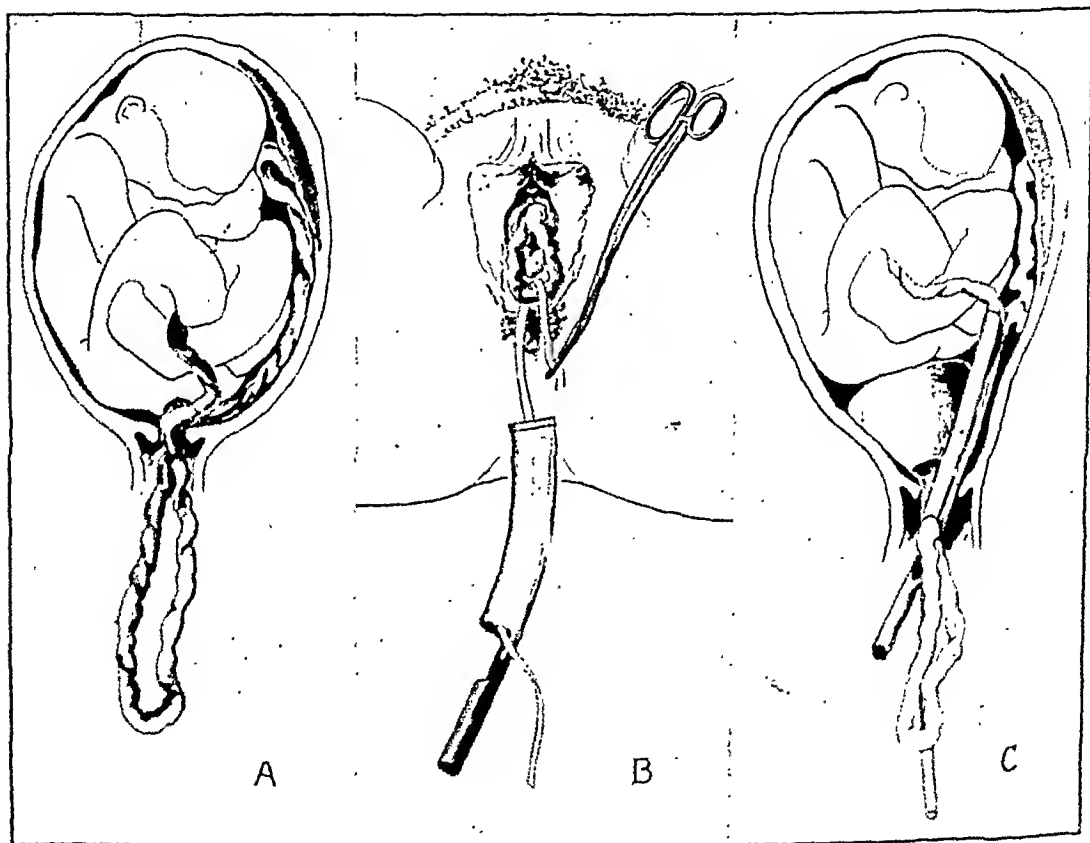


FIG. 2.—Showing method of application of the protective shield. A, Diagrammatic sketch of a cord prolapsed through an undilated cervix. B shows a loop of umbilical tape with one branch threaded through the shield and the other about to be threaded after it has been carried through the prolapsed loop. C, The protective shield and a Voohees' bag in situ.

Department of Book Reviews

CONDUCTED BY ROBERT T. FRANK

Review of New Books

Gynecology

Matters presents in *The Cervix Uteri*¹ a general survey of our present knowledge regarding the cervix with special reference to the development of cancer, the subject which he has dealt with in the literature. Concerning the cervix as a definite entity he lays particular stress on the early diagnosis of malignant change in light of our knowledge of pelvic physiology. He suggests that hormonal control of the cyclic changes in the human female causes the well-defined structural changes which occur in the cervix coincident with the menstrual cycle. He refers to the physiologic variants in the amount of the cervical secretions which are coincident with the alterations in the cycle. In his discussion of the pathology found in the cervix, he takes up the mechanism of lacerations and other forms of trauma related to the later development of malignant conditions. Further he reviews the various infections to which the cervix is subject, venereal, postabortal, puerperal, and brings out the relationship of the cryptogenic infections to reflections and reactions in distant areas, other than toxic absorption. There are excellent sections referring to the care of the cervix during parturition and of its examination and care at the end of the postpartum period and later on.

The menopausal changes of the cervix are discussed with reference toward an early diagnosis of the "pre-malignant" cervix. In describing the embryology and the anatomy of the cervix he brings out the nature of the lymphatic spread in malignancy. In discussing the endocrinology of the cervix he goes into detail as to the estrogenic influences and their apparent similarity under certain circumstances to carcinogenic stimuli. Here he gives the experimental technique, and results, which he has carried out on rats, injecting them with various amounts of estrogenic substances in an effort to ascertain if carcinogenesis may be caused in this manner. He regards three stimuli as tending toward the development of cancer of the cervix: first, overactivity of the anterior-pituitary gland; second, underactivity of the post-pituitary gland; and third, increased demand for carbohydrates giving rise to abundant enlarged islets of Langerhans. Dr. Matters is busying himself with an effort toward making possible the diagnosis of "pre-malignancy" of the cervix, and has used in this connection the Schiller test biopsy and the animal test for prolactin. He presents an outline of clinical investigation to determine the relationship of the estrogenic hormones and carcinogenesis (page 60).

The section on treatment leaves little to be desired and ranges from topical application to the Wertheim operation, with cautery, electrocoagulation, diathermy, radium, x-ray and other procedures.

¹*The Cervix Uteri, With Special Reference to the Development of Cancer.* By R. Francis Matters, Lecturer in Human Physiology and Pharmacology, University of Adelaide, etc. Illustrated, 197 pages. The Hassell Press, Adelaide, 1935.

KIRSCHNER-WAGNER OPERATION FOR CONSTRUCTION OF ARTIFICIAL VAGINA*

DAVID N. BARROWS, M.D., NEW YORK, N. Y.

IN CASTING about several years ago for a simple, safe operation for construction of an artificial vagina in a case of congenital aplasia, we were attracted to the Kirschner-Wagner procedure mainly by two factors: no possibility of endangering the patient's life and desirability of a short period of hospitalization.

There are many well-tried and well-established operations for congenital absence of the vaginal canal, but most of them have one or the other of the above objectionable features. Perhaps the most formidable risk is the well-known Baldwin operation from which, as in any bowel resection, there is, of course, a risk of peritonitis or fistula. Masson, at the Mayo Clinic, however, has recently reported a dozen successful results without mortality.

Another objection to this procedure is the fact that secretions from the small intestinal mucosa may irritate the skin about the vulva.

The other main type of operation is that in which flaps of skin are turned up from the surrounding thighs, buttocks and/or abdomen. The best known and most popular of this group is R. T. Frank's operation, which consists of dissecting a flap from the inner side of the adjacent thigh and by several stages forming a tube lined with epithelium which is evidently turned in and sutured in place from below. In this way, a very satisfactory, capacious and well-lined vagina is formed. This procedure has few drawbacks except the prolonged time consumed due to the fact that it must be done in several stages. One other objection to the use of skin flaps from the immediate vicinity of the vulva, which is present in many of the flap-formed types of canal, is that hair follicles are not entirely absent from these thick skin flaps and cause considerable annoyance in the artificial passage.

This excellent monograph with its very thorough bibliography may be regarded as a valuable contribution.

—Philip F. Williams.

Jameson in his *Gynecological and Obstetrical Tuberculosis*² has kept three aims in view: the alterations in the pathological physiology of the female genital apparatus consequent to pulmonary tuberculosis, the various forms of female genital tuberculosis, and the survey of the problem of pregnancy in tuberculous women. The main data were obtained at Saranac Lake, some of the clinical and autopsy material through the cooperation of Professor Fraser of Montreal, and Doctors Gibb and Popoff of Rochester, New York.

In tuberculous patients, dysmenorrhea was more frequent, and premenstrual and menstrual elevations of temperature were common. In reviewing the subject of pregnancy and tuberculosis, the author gives an excellent résumé of world opinion. His own point of view is sufficiently general to allow of almost any interpretation, largely influenced, as it should be, by the type of individual case demanding decision. The only method apparently employed is the emptying of the uterus under anesthesia, although aware that roentgen ray abortion is a method that can be used.

This monograph is well written, but it places too much emphasis on the literature and the opinion of others, although the author has apparently had a large personal experience, which the reviewer for one would have preferred to have emphasized. An excellent bibliography is appended.

—R. T. Frank.

The eighth edition of Crossen's *Diseases of Women*¹ has just appeared. In this, Robert James Crossen is co-author. The entire book has been revised and reset. It now contains 1,058 illustrations. It is 999 pages in length.

The book is sufficiently well known and has really been accepted as a classic for so long that an extended review is hardly necessary. Its contents are even more encyclopedic than before. The text has been brought up to date, great care being shown in the selection and completeness of incorporated new material.

The reviewer was particularly impressed with the care taken in the chapter on anatomy and physiology, in which the endocrine phases of sex phenomena are described in an unusually clear fashion. There are 148 pages devoted to gynecologic pathology, in which ovarian tumors are especially featured.

The illustrations of this book are unique in that every effort has been made to incorporate the best from widely distributed sources, due credit, of course, being given to the authors, in addition to many original figures of the authors, which are beautifully executed and well reproduced.

This book is so well arranged that it is of great use to the student and yet will continue to prove of value later in his activities as a general practitioner or specialist. Between this volume and *Operative Gynecology* by the same authors, an unusually full and complete survey of the entire field of gynecology can be obtained.

—R. T. Frank.

¹*Gynecological and Obstetrical Tuberculosis*. By Edwin M. Jameson, M.D., Fellow of Trudeau Foundation, attending surgeon, Saranac Lake General Hospital, etc. Illustrated with 31 engravings. Pp. 256. Lea & Febiger, Philadelphia, 1935.

²*Diseases of Women*. By Harry Sturgeon Crossen, Professor Emeritus of Clinical Gynecology, Washington University School of Medicine, etc., and Robert James Crossen, Instructor in Clinical Gynecology and Obstetrics, Washington University School of Medicine, etc. Eighth edition, entirely revised and reset. With 1,058 engravings, 100 pages. The C. V. Mosby Co., St. Louis, 1935.

hospital, she was given a dilator of hard rubber of rectal type, as a glass one is easily broken, and we discovered at that time that she was not married although she had told us that she was married on admission. Six months later the canal was found to admit 2 fingers for a distance of 6.5 cm., and to have a remarkably healthy lining. Patient complained of very little discharge. Some limitation of elasticity of the vault of the vagina occurred from scar tissue.

CASE 2.—F. S., aged twenty-six, with an absence of vagina, desired to marry. Patient had a single fused kidney discovered on laparotomy several years ago, and entire absence of the vaginal canal. No uterus was present. Female development was quite normal superficially, and her prospective husband insisted on having the operation performed. Patient well-developed adult of distinctly feminine type. Breasts showed no abnormalities. No evidence of any vaginal canal and no depressability of the tissues of the vulva; slight suggestion of a cribriform hymen. Attempted dilatation of this was unsuccessful. Transverse incision between the bladder and rectum to admit three fingers was carried to a depth of 10 cm. by blunt dissection. A 5 by 12 cm. rubber sponge prosthesis, with central drainage of a silk No. 16 French catheter, was covered with multiple skin grafts as in the previous case, sutured in place by four silkworm sutures. Removed with the sponge on the eleventh day postoperative and dilatation started immediately. Patient was discharged on the twenty-fourth day after ten days out of bed with careful instructions as to the use of a dilator. Patient was kept in a little longer than necessary to make certain of the early dilatation. This case has proved 100 per cent satisfactory on physiologic test.

Of 32 cases reported in the literature including these two, there have been only five poor results mentioned, and in these the canal, or rather, the caliber of the canal, might have been preserved at a satisfactory size by better dilatation.

REFERENCES

- (1) *Alfrow, M. W.*: Zentralbl. f. Gynäk. 57: 884, 1932. (2) *Döderlein, G.*: Ztschr. f. Geburtsh. u. Gynäk. 101: 456, 1932. (3) *Fraenkel, L.*: Zentralbl. f. Gynäk. 56: 1305, 1932. (4) *Friedl-Meyer, M.*: Deutsche Ztschr. f. Chir. 244: 379, 1935. (5) *Heller, P.*: Zentralbl. f. Gynäk. 56: 2491, 1932. (6) *Henkel, M.*: Ztschr. f. Geburtsh. u. Gynäk. 104: 36, 1932. (7) *Heynemann*: Zentralbl. f. Gynäk. 57: 1540, 1933. (8) *Kayser, K.*: Zentralbl. f. Gynäk. 56: 1633, 1932. (9) *Kirschner, M., and Wagner, G. A.*: Deutsche Ztschr. f. Chir. 225: 242, 1930. Abstr. Zentralbl. f. Gynäk. 54: 2690, 1930. (10) *Köhler, H.*: Zentralbl. f. Gynäk. 57: 1182, 1933. (11) *Kraul, L.*: Zentralbl. f. Gynäk. 58: 2393, 1934. (12) *Lichtenauer, K.*: Deutsche Ztschr. f. Chir. 222: 375, 1931. (13) *Milander, J.*: Zentralbl. f. Gynäk. 55: 2746, 1931. (14) *Müller, P.*: Zentralbl. f. Gynäk. 55: 291, 1931. (15) *Ostrel, A.*: Zentralbl. f. Gynäk. 55: 1900, 1931. (16) *Pribrsky, J.*: Zentralbl. f. Gynäk. 59: 403, 1935. (17) *Rother*: Zentralbl. f. Gynäk. 57: 1370, 1933. (18) *Schubert, G.*: Ber. ü d. ges. Gynäk. u. Geburtsh. 23: 241, 1932. (19) *Stöckel, W.*: Monatsschr. f. Geburtsh. u. Gynäk. 90: 23, 1932. (20) *Warnecke, K.*: Zentralbl. f. Gynäk. 56: 416, 1932. (21) *Westman, A.*: Acta obst. et gynec. Scandinav. 13: 169, 1933. (22) *Vogt, E.*: Zentralbl. f. Gynäk. 55: 1634, 1931.

BOOK REVIEWS

Volume I of a series entitled *Cirugia Pelviana*³ (Pelvic Surgery) is published by Rocha who is Professor of Surgery at Montevideo, Paraguay. It is a small, concisely written book covering the surgical anatomy of the pelvis, and is divided into 4 parts dealing with embryology, osseous and soft parts, fascias, and the so-called "visceral-pelvic pedicle."

The first 3 of these offer nothing new, but are adequately presented. The "visceral pelvic pedicle" is a leaf-shaped area whose vertex is situated at the umbilicus, base at the sacrum, and whose margins are formed by the umbilical arteries. It includes the structures surrounding the bladder, uterus, and rectum, comprising fascias, ligaments, vessels, nerves, and lymphatics. In the author's opinion it is of prime importance in pelvic surgery.

Modern books dealing with embryology and anatomy, especially when limited to one particular field, appear rather infrequently. For this reason alone this book is welcome. The only serious defect that should be rectified is its lack of illustrations. Many of these are actual photographs of dissected specimens which, although praiseworthy, do not allow for a clear enough presentation of the structures. For this reason, also, the text is often difficult to follow.

—Frank Spielman.

The seventh volume of Stoeckel's *Handbuch der Gynäkologie*⁵ has just come into the reviewer's hands, although dated 1932. It is of big size, containing 1,014 pages. Two topics are discussed: one, the diseases of the ovary and parovarium by Fritz Kermauner of Vienna, who has since died; and the other, tumors of the fallopian tubes by L. Nürnberger of Halle. There are 574 pages devoted to the first topic and 393 to the second.

Every disease of the ovary is discussed, including ovarian pregnancy in which the American portion of the literature is most incomplete. The main discussion on the ovary naturally deals with neoplasms of this organ. The first portion on ovarian growths includes the benign, not strictly neoplastic, enlargements. The second portion covers neoplasms or blastomas. Kermauner has not attempted any new type of classification but sticks largely to that of Pfannenstiel as well as the new classification of von Franqué. In dealing with fibroma of the ovary, no mention of the occurrence and frequency of hydrothorax is given, although this is now a well-recognized syndrome in combination with ascites. The illustrations, especially those of pseudomucous cysts of the ovary, are profuse and illuminating. Of approximately 200 cases, only 16 showed carcinomatous degeneration. Granulosa and theca cell tumors are classified strictly according to their morphology, no attempt to employ biologic methods of differentiation being made. The illustrations of dermoids include many rare conditions, although it is impossible to agree with the author in all of his interpretations, for example, such as tonsils and prostate.

Both from a clinical point of view and that of a pathologist, the treatment of ovarian tumors is satisfactory. Operative methods and treatment are likewise discussed as well as the results obtained by operation. The final chapter deals with radiotherapy and the proper method of alleviating the suffering of inoperable conditions.

Nürnberger divides neoplasms of the tube into those of the mucosa, muscularis, subserosa, serosa, and fimbriae. In his description of tumors, a statistic of primary

³*Cirugia Pelviana*, (Primexo) tomo. Anatomia quirurgica, pediculovisceral-pelviana. Por Osear Rodriguez Rocha, professor agregado de Cirugia, Facultad de Medicina de Montevideo. Casa A. Barreiro y Ramos, Montevideo, 1935.

⁵*Erkrankungen der Eierstöcke und Nebeneierstöcke und die Geschwulste der Eileiter*. Bearbeitet von F. Kermauner, Wien, und L. Nürnberger, Halle. Siebenter Band in Stoeckel's *Handbuch der Gynaekologie*. Mit 472 zum Teil farbigen Abbildungen im Text, 1,014 Seiten. Verlag von J. F. Bergmann in Muenchen.

Urine examination gave albumin 3-plus, sugar 0, acetone 4-plus, diacetic acid 1-plus, few coarse granular casts, 10 to 16 leucocytes per high power field, with a few red blood cells.

She was given 375 c.c. of 5 per cent glucose in normal saline solution intravenously and prepared for operation, should a definite indication arise. At 10:30 p.m. her condition improved, the vomiting ceased, and the pulse dropped to 120. The temperature was 99° F. The uterus was softer and she began to have rhythmic contractions every two or three minutes. Dr. E. J. Krahulik was called in consultation and examined the patient at 11:30 p.m. At that time there were regular uterine contractions and no rigidity. Rectal examination revealed a cervix 2 cm. dilated; no effacement. The vertex was below the spines. The possibility of premature separation of the placenta was considered but symptoms were not typical. On account of the prematurity and improvement in her condition, it was decided to continue observation. At 1:30 a.m. fetal heart tones were 148, blood pressure 110/78, temperature 100° F., pulse 96, respirations 24. Contractions every two to five minutes. At 2 a.m. the contractions were stronger and they continued throughout the night until 6 a.m., when they ceased. At 8 a.m. the blood count was 21,000, polymorphonuclears 80 per cent, lymphocytes 16 per cent, large mononuclears 4 per cent, Schilling, segs. 42 per cent, stabs 36 per cent, juveniles 2 per cent. Urine, specific gravity 1020, acid, albumin faint trace, 2 to 5 white blood cells per high power field. The fetal heart tones were good. She was placed on a soft diet. She slept well. The following morning the white blood count was 14,950, polymorphonuclears 74 per cent, lymphocytes 25 per cent, eosinophiles 1 per cent, Schilling, segs. 56 per cent, stabs 17 per cent, juveniles 1 per cent. She was dismissed from the hospital May 1, 1934, apparently free from symptoms.

In search for the cause of the unexplained symptomatology, arachnoidism was considered and the patient questioned, since the possibility offered the solution. She recalled having been bitten by a spider two days previous to the onset of her illness. She was cleaning out a closet when she felt something crawling on her breast. After an attempt to remove it she felt a stinging sensation over the upper abdomen. Grasping her clothing she killed a spider, described by her as black, about the size of a nickel, with a red mark on the abdomen (black widow, *Latrodectus mactans*). Soon after this she noted a large red spot to the left and a little above the umbilicus, and there was itching and slight pain over this area. She thought nothing of the incident until it was recalled by the questioning. She stated that these spiders were numerous in her apartment, especially in the closets and bathroom. Following this information a careful examination was made of the abdomen and a small indurated area was found 3 cm. above and 1 cm. to the left of the umbilicus.

Although the bite had occurred two days previous to the onset of the symptoms, the possibility of there being a delayed reaction because of the pregnant state may be considered, or there might have been another bite unnoticed by the patient.

On May 17, 1934, the patient was delivered of a normal boy, weighing six pounds, two ounces. The labor was normal, the placenta showed no pathologic changes. The puerperium was afebrile and uneventful. Observation was continued for the past nine months and she has enjoyed perfect health in that time.

COMMENTS

tubal carcinoma takes up 125 pages in the form of tables, and covers 301 cases from 1886 to 1931. This adds unduly to the bulk of this already large volume.

This contribution will be found of great value in looking up the Germanic literature which is very completely dealt with. Much of the basic literature can be found. It contains little new material but has brought Veit's previous edition up to date. The illustrations, as in the last of these volumes, are profuse, excellent, in many cases colored.

—R. T. Frank.

Stocckel's *Practice of Gynecology*⁶ has a fifth edition appearing one year after the preceding one. The book as heretofore is of large size with more than 750 pages and with an increasing number of exceptionally fine illustrations and colored plates.

This volume gives an unusually good survey of the subject of gynecology, clearly and concisely written and well arranged. Operations are indicated but the operative phase is not particularly stressed as the text is largely meant for students and practitioners, although it contains much information of importance to the specialist as well. In addition to the usual contents of gynecologies, the related phases of urology are carefully entered into. Gynecologic endocrinology is very clearly described. Such related subjects as diseases of the abdominal wall and rectum are also discussed. Symptom-complexes described include backache and chronic constipation; methods of treatment discussed take up radiotherapy, thermo- and heliotherapy, as well as the hygiene of menstruation. As in the previous edition, the last chapter includes the gynecologic pharmacopoeia which includes innumerable preparations quite unknown on this side of the Atlantic. References to the German literature are full. Approximately 10 or 12 references to the American literature are included. The rest of the world has been almost entirely ignored.

—R. T. Frank.

Novak believes that with some knowledge of sex biology, the woman is a better patient. His book on *The Woman Asks the Doctor*⁷ is a simple exposition of the problems of womankind, with a selection of subjects which are of particular interest to them.

He discusses the difference between femaleness and maleness, the anatomy of the genital organs, with a very simple but understandable discussion of the physiology of the sex cycle, as well as those of the various endocrine glands. The periods of life, including puberty, the years of sexual maturity and the "change of life" are taken up. He also mentions the disorders of menstruation, sterility, leucorrhea, and cancer, and finally a short chapter on sex life.

This book is unpretentious, well written, without exaggerations, and should be understandable to any educated person.

—R. T. Frank.

Estudos Cirurgicos by Ribeiro is an attractively presented book, consisting of 22 articles dealing with a wide variety of surgical subjects. Included are such topics as ovarian cysts, tumors of the appendix, heterotopic dentition, supernumerary breasts, typhoid perforation of the intestine, cancer of the gallbladder, fracture of the frontal bone, etc., to mention only a few. Most of the articles are case reports.

⁶*Lehrbuch der Gynäkologie.* Von Professor Dr. W. Stocckel, Universitäts-Frauenklinik zu Berlin. Fünfte, neubearbeitete Auflage, mit 465 Abbildungen im Text und auf 66 farbigen Tafeln. Verlag von S. Hirzel in Leipzig, 1935.

⁷*The Woman Asks the Doctor.* By Emil Novak, M.D., Associate in Gynecology, Johns Hopkins Medical School, etc. Illustrated by Carl Clarke. Williams & Wilkins Company, Baltimore, 1935.

Estudos Cirurgicos. Por Eurico Branco Ribeiro. I. Serie. 241 páginas. Sociedade Editora Médica Limitada. São Paulo, Brazil, 1934.

In one patient, in whom an artificial menopause had been induced with radium three years prior to the onset of this treatment, and in whom the vasomotor flushes and acroparesthesia were severe, no relief was obtained even after using 300 rat units twice a week for four weeks. Relief might have been obtained with much larger doses, but these could not be obtained because of the cost. Another patient, in whom a surgical menopause had been induced four years previously, and in whom vasomotor flushes, acroparesthesia, and allergic (hay fever, mild asthma) symptoms occurred simultaneously in May of each year since, received slight relief from 300 rat unit doses administered twice weekly.

SUMMARY

A small series of cases (twenty) is presented in which acroparesthesia was prominent as a symptom and evidently associated with the menopause. Treatment with theominal in two cases, and estrogenic hormone in sixteen cases produced almost complete relief.

In one case, following artificial menopause induced by radium, no relief was obtained. In another case, following surgical castration, only slight relief was obtained.

REFERENCES

- (1) Borak, J.: *Endokrinologie* 5: 9, 1929. (2) *Wechsler, Israel S.: A Textbook of Clinical Neurology*, ed. 2, Philadelphia, 1931, W. B. Saunders Co., pp. 650, 651.

TORSION OF THE HYDATID OF MORGAGNI SIMULATING EARLY RUPTURED ECTOPIC PREGNANCY

I. TRACTENBERG, M.D., BROOKLYN, N. Y.

(From the Gynecological Clinic of Unity Hospital)

THE case herein described is reported because it is extremely rare and simulated an early ruptured ectopic pregnancy.

Mrs. H. B., a well-developed female, twenty-nine years of age, was admitted, by ambulance, to the hospital, with complaints of acute abdominal pain in the lower left quadrant. She appeared very ill upon admission.

Her menses began at the age of thirteen, lasting four days, recurring about every three months, accompanied by severe pain. She married at the age of twenty and was married eight years when the symptoms of acute condition of the abdomen came on. After her marriage, her periods became regular, of the twenty-eight-day type. Two years later she was delivered of a normal child. Her pregnancy and parturition were normal in every respect. She felt well up to three years ago when her periods began to become irregular and again were accompanied by dysmenorrhea.

About two months before her admission to the hospital the pain increased in severity and was accompanied by nausea and vomiting. It was aggravated by walking and greatly relieved by rest. On the day she was admitted to the hospital she experienced a sharp, agonizing cramplike pain in the lower abdomen with nausea and vomiting.

for prolapsus. The acute myocardial failure occurred four days following cesarean section for premature separation. Sterilization was done because of the cardiac condition. Peritonitis occurred following cesarean section which was done for premature separation. Classical section was done as this patient had had no examinations and membranes were intact. Sterilization was performed because of her cardiac condition. The pneumonia developed following cesarean section under local anesthesia. This patient was referred to us for cesarean section and sterilization by the cardiovascular clinic.

METHODS OF STERILIZATION

At the present writing there are several methods of sterilization in the female. As these statistics have only to do with surgical procedures, I shall omit all discussion on sterilization by irradiation, radium, hormonal sterilization, spermotoxins, or other procedures which have been advised from time to time.

In the discussion of sterilization by surgical methods, I believe that in the absence of pathology in the uterus or in the ovarian structure, the removal of these organs to prevent conception should not be done, particularly in women during the second and third decades of life. It, therefore, narrows our discussion to operative procedures which produce anatomic changes that will keep the spermatozoa from meeting and fertilizing the ovum. It furthermore practically narrows down to operations upon the fallopian tubes.

When one consults the literature as to the best method of obtaining this result, one is impressed first, by the innumerable procedures which have been advised, and second, by the fact that in almost every method where a large series has been reported there has occurred a failure. I shall not take time to enumerate or discuss the various procedures which have been advised, but will concentrate my discussion on the method which has been employed in this series of 223 cases. The same procedure has been carried out in each case.

Up until October, 1924, we had no standardized method of sterilization. The general rule, however, was to remove both fallopian tubes with a wedge-shaped piece of the cornu of the uterus. Shortly before this time we were particularly impressed by two things; one was that notwithstanding the supposedly complete removal of the cornual end of the tube, one or two patients became pregnant; and second, there were, within a short period of time, five patients admitted who had to have subsequent laparotomies because of cystic disease of one or both ovaries following salpingectomy. From the clinic of the late Dr. Ralph Pomeroy, there emanated a technique for operation upon the fallopian tube which, because of its simplicity and safety, warranted a trial. We were not at all impressed with its security, but as time went on we have become more and more impressed with the fact that it might be described as not only safe and simple, but also a secure procedure. Although I do not believe that Dr. Ralph Pomeroy made

tive. Blood pressure during the pregnancy ranged between 90/60 and 110/60. Urine was negative for sugar and albumin. Blood chemistry and Wassermann tests were not done.

The first stage of labor began on Oct. 14, 1934, at 7.30 A.M. Membranes had ruptured a few hours prior to the onset of pains. The pains at this time were fairly effectual. The second stage began at 2 P.M. of the same day. Pains were strong and occurred every three minutes. At 5:10 P.M. the patient developed a chill of thirty minutes' duration; no anesthesia was used for the spontaneous delivery which occurred at 5:17 P.M. Placenta was delivered at 5:35 P.M. She had a slight laceration of the perineum which required two stitches. Bleeding was normal. At 6:15 P.M. she became flushed and developed a rectal temperature of 104° F., pulse rate of 160, and respirations of 25 per minute. At 7 P.M. she began to bleed moderately and because of her general condition and the fear of serious hemorrhage, the uterus was packed and the bleeding controlled. At 8 P.M. she went into shock, but reacted to the usual therapy which included an intravenous 5 per cent glucose in normal saline. At 11 P.M. she vomited brownish fluid and then rested quietly until 12 M., when she suddenly became cyanotic, dyspneic, and very restless; the pulse became very weak and thready. Repeated stimulation failed to improve the pulse and the patient died at 1 A.M. on Oct. 15, 1934. Just before she died she regurgitated a profuse amount of brownish fluid from her mouth and nose.

A postmortem was performed by Dr. Joseph C. Ehrlich. There were no petechial hemorrhages and no peripheral edema. On opening the abdomen there was no evidence of peritonitis or free fluid in the peritoneal cavity. The stomach was markedly dilated and the intestines were not distended. The right heart was markedly dilated, the wall increased in thickness; the wall of the right ventricle showed an increase in fat, the left auricle was normal in size. The left ventricle was slightly dilated and the wall was of normal thickness. The general appearance of the heart muscle was of a grayish pink color, with pale streaks. It was soft in consistency and presented the appearance of a marked parenchymatous degeneration. The lungs showed areas of congestion and pulmonary edema. The liver weighed 1,400 gm., and had a pasty appearance and was exceedingly pale. A mass the size of a golf ball, which on section presented a yellow appearance, was present in the right lobe posteriorly. This was a large hepatoma which did not present any distinguishing features microscopically. The kidneys weighed 280 gm. and revealed the picture of parenchymatous degeneration. Both kidneys showed dilatation of pelvis and calyces. There was marked congestion of the mucosa of the pelvis. A thick greenish exudate was found in the pelvis which on culture revealed a *Streptococcus hemolyticus*. The spleen weighed 275 gm. and appeared congested and of a semifluid consistency, typical of a septic spleen. Culture here also revealed *Streptococcus hemolyticus*. The uterus, tubes, and ovaries showed nothing pathologic.

The cause of death was acute cardiac failure, caused by parenchymatous degeneration and an underlying septic process, the cause of which was undetermined. One might suspect that there was some connection between the abscessed tooth and the sepsis.

such as that of health commissioner of Baltimore and dean of the Johns Hopkins Medical School. Although at Johns Hopkins, the Departments of Gynecology and Obstetrics are under separate heads, Williams throughout his activity, believed firmly that these departments should be united.

This is a very sympathetic and readable biography of this famous figure.

—R. T. Frank

Miscellaneous

In 1930 Dr. Magnus Hirschfeld, the well-known "sexologist," came to New York at the invitation of the New York Deutsche Medizinische Gesellschaft, and from then on wandered across the United States. In response to further invitations, he traversed the Orient, including the Near East. He has incorporated the Asiatic and African portion of his travels in a delightful book, *Men and Women, the World Journey of a Sexologist*.²⁶

In this travelogue he includes not only all that he has seen as a tourist, but also that which his reputation and special interests enabled him to see from the point of view of a sexologist.

"The struggle between the sexes is far from being at an end." The point of view differs in every country that you traverse. The multiplicity of contrary views shows on what uncertain ground the stoney forest of legal status has been reared—cross a border and what on the near side one would be prosecuted and punished for, on the other side may be done with impunity. In Asia twins are regarded as freaks and monstrosities.

It is impossible in this review to do full justice to the charming and informative style of presentation which is evident, probably because of the excellent translation by O. P. Green, or to give even a faint idea of the innumerable incidents of interest to every reader. There is a fund of information on sex topics gleaned in Japan, the Philippines, the Dutch Islands, Bali, China and Egypt. Whether one agrees with the interpretations of Hirschfeld or not does not detract from the value and fascination exercised upon the reader.

—R. T. Frank

Guggisberg has published a monograph on the *Importance of Vitamins to the Female*.²⁷ This represents a bringing up to date of his previous contribution of the same title which appeared in Volume VIII, Part 3 of Halban-Seitz, *Biology and Physiology of the Female*, in 1929. The text in the main follows what was found in Halban-Seitz with the addition of the large increase in our knowledge which has been acquired in the last six years. It is one of the few books in which vitamins, as applied particularly to gynecology and obstetrics, can be studied without having constant recourse to the scattered literature.

The author emphasizes the innumerable contradictions which any attempts to study the literature evidence. It is almost impossible to judge the effect of vitamins and their importance by clinical study. The conditions in the human being are so much more complicated than in the fully controlled laboratory animal that deductions are misleading. Pathologic observations on the human being, likewise, give no conclusive evidence. In general, it may be said that the one group of clinicians greatly overrates the importance of vitamins, while the other is inclined to take an entirely agnostic stand. Time alone will enable us to steer a middle course. Even in the most easily evaluated disease, namely beriberi, an increasing number of ob-

²⁶*Men and Women, The World Journey of a Sexologist*. By Magnus Hirschfeld. English version, illustrated, 325 pages. G. P. Putnam's Sons, New York, 1935.

²⁷*Die Bedeutung der Vitamine fuer das Weib*. Von Professor Dr. Hans Guggisberg, in Bern. Mit 19 Abbildungen im Text und 4 farbigen Tafeln. Urban und Schwarzenberg, Wien, 1935.

In many schools where neither contraception nor sterilization was being taught the deans believed that instruction in the subjects should be given. The overcrowded curriculum was usually assigned as the reason for not including the subjects in the regular course of instruction. There were few instances where disapproval was expressed.

Interest in the field was not confined to any section of the country. The South is usually considered very conservative, but answers to our questionnaire showed that it was as progressive, in this respect, as the North or West. The greatest conservatism was displayed in schools in states where the laws were most restrictive; and in one school in the East it seemed to have been thought better, after consultation with various members of the faculty, not to commit the institution to anything, by leaving the questionnaire unanswered.

Thirty schools reported no contraception teaching, though some were planning for it, and approved it in principle. Table I shows the total number of schools teaching either subject, and the method of instruction. No details were given by the deans, nor were the number of lectures or textbooks used indicated.

TABLE I. METHOD

	LECTURE AND CLINIC	LECTURE ONLY	CLINIC ONLY	UNSPECI- FIED	TOTAL
Contraception	12	11	2	3	28
Sterilization	16	9	4	2	31
Not teaching contraception but teaching sterilization	—	—	—	—	8
Not teaching either subject	—	—	—	—	20

In the schools where contraception was taught, 25 gave the instruction in the Departments of Obstetrics or Gynecology, 1 in the Department of Social Hygiene and Criminology, 1 in the Department of Preventive Medicine and Clinical Demonstration, and 1 was unspecified. One school taught only the danger of the use of certain devices, and so was not included in the list.

The schools teaching sterilization gave their instruction as follows: 22 in the Departments of Obstetrics and Gynecology; 4 in the Departments of Obstetrics, Gynecology and Urology; 3 in the Department of Surgery; 1 in the Department of Preventive Medicine and Clinical Demonstration; and 1 was unspecified.

One school, which taught by lecture only, referred patients to an extramural clinic in a health center for contraceptive advice, while those eligible for sterilization were referred to state institutions. The dean in this school considered, however, that both types of care should be given in the medical school clinics themselves.

COMMENTS AND OPINIONS

The Committee's inquiry was intended both to sound out opinion and to count the schools teaching the subjects in question. The returns in 1933 showed a difference from reports of five years ago or earlier. There have been decided changes not only in public opinion, but also in the field of medical jurisprudence, as evidenced by such legal decisions as that of the United States Supreme Court (Justice Holmes) affirming the constitutionality of the law for eugenical sterilization in the Virginia case of *Buck vs. Bell*. Also, there have been many favorable judicial interpretations of the obscenity laws.

servers are inclined to ascribe the disease to not only deficiency in vitamin B, but to other factors as yet unknown. Even factor A, absence of which is supposed to produce keratomalacia, can be imitated by other conditions, as for instance, deficient carbohydrate nutrition in children with excessive sodium chloride additions.

It is quite possible that even when all of the necessary factors are taken in the food, as is usual in adults on a mixed diet, mistakes in preparation of the meal may produce avitaminosis. In the human being, it is practically always a long-continued diminution of the vitamin rather than its entire absence which produces the trouble.

To avoid vitamin deficiency, an increased use of milk products and butter, as well as vegetables and a definite amount of uncooked organic material, must be ingested. Especially valuable are salads and fruits.

The author concludes that our entire knowledge of vitamins is still incomplete even if some of the vitamins are available in completely purified form.

—R. T. Frank

Harnes's *Clinical Management of Syphilis*³⁰ is a short, clear, well-planned and well-written monograph which takes up every phase and every stage of syphilis. It fully outlines and gives details of the treatment of every stage. The preparation of the solutions to be used are so well outlined that even those unfamiliar with the technic should readily be able to follow the directions. Not only are the primary, secondary, and tertiary stages of the disease dealt with, but also special chapters on visceral manifestations, on the treatment of pregnant women, and on congenital syphilis are given. The importance of serology, especially of the spinal fluid, is emphasized. All in all, this is a very satisfactory outline for the general practitioner, who in so many instances must treat this disease in its acute and chronic stages.

—R. T. Frank

Singer has produced a combined text and atlas in which he brings together the *Fasciae of the Human Body*.³¹ The illustrations are excellently done and readily understood. This applies particularly to the head and extremities.

It is a pity that the author has confined both his text and illustrations entirely to the male as he would have had an excellent opportunity to clarify the pelvic fasciae in the female as well, particularly as this phase of anatomy has been largely neglected in the United States.

—R. T. Frank

The *A B C of the Endocrines*³² by Jennie Gregory, at first glance, appears an amusing picture book, but when more carefully studied, it is surprising how much information is contained in the full-page graphic charts which, with their legends, form the entire text. Whether, as the author hopes, the average lay reader can gather as much from these charts as can the physician, I am unwilling to affirm. Even if this, the main aim of the book, should not be reached, every teacher of medical students will find much information and methods of illustrating the complicated endocrine situation for his classes. The ingenuity, artistry and intelligibility of this new venture are admirable.

—R. T. Frank

³⁰*Clinical Management of Syphilis*. By Alvin Russell Harnes, M.D., Chief of Congenital Luetic Clinic, New York Hospital. The Macmillan Company, New York, 1935.

³¹*Fasciae of the Human Body, and Their Relations to the Organs They Envelop*. By Edward Singer, M.D., Department of Anatomy, College of Physicians and Surgeons, Columbia University. With 24 original illustrations, 105 pages. The Williams & Wilkins Company, Baltimore, 1935.

³²*A B C of the Endocrines*. By Jennie Gregory, M.S. Foreword by Carl G. Hartmann. Illustrated with 126 pages. The Williams & Wilkins Company, Baltimore, 1935.

If centers for marriage counsel are started, emphasis at first should not be on service to the maximum number of couples, but on intensive study and follow-up of individual clients. Beginnings in this field have been made already in many parts of the country, and we can look to the experience of these centers to round out and improve our present tentative methods.

REFERENCES

(1) J. A. M. A. 99: 738, 1932. (2) *Gosney, E. S., and Popenoe, Paul*: Sterilization for Human Betterment, New York, 1929, The Macmillan Company, p. 170. (3) Bull. New York Acad. Med. 7: 305, 1931. (4) Sub-Committee I on Obstetric Teaching and Education of the White House Conference on Child Health and Protection, New York, 1932, Century Co., p. 47. (5) *Knopf, S. Adolphus*: New York Med. Times 58: 108, 1930.

Society Transactions

NEW YORK OBSTETRICAL SOCIETY

MEETING OF MAY 14, 1935

The following paper and case reports were presented:

A *Résumé* of 223 Cases of Surgical Sterilization. Dr. Clifford B. Lull, Philadelphia, Pa. (By invitation.) (For original article, see page 101.)

Kirschner-Wagner Operation for Construction of Artificial Vagina, 2 Cases. Dr. David N. Barrows. (For original article, see page 156.)

Report of a Case of Tubo-Ovarian Pregnancy. Dr. William T. Kennedy.

Mayer, L.: Experiments and Clinical Results of Ovarian and Uterine Grafts. *Rev. franç. de gynéc. et d'obst.* 29: 827, 1934.

Experiments on dogs and clinical experience lead Mayer to the belief that autografts of ovarian tissue should be utilized systematically among all women under fifty years of age who have to have both ovaries removed. It is important to graft fragments from the superficial portions of the ovary and to handle these pieces of tissue very gently in order not to destroy the germinal epithelium and the underlying primordial follicles. Autografts of uterine tissue in subcutaneous cellular tissue readily take, and the resulting utero-ovarian hormones have a distinct effect on the development of the ovarian grafts. In cases where a subtotal hysterectomy is performed it is useful to add a uterine graft to the ovarian one. It is effective, simple and without danger.

J. P. GREENHILL.

Peterson, in *The Patient and the Weather*,³¹ has given a new, interesting, but rather bewildering description on how the patient is affected by the weather. The author claims that today we focus too much on the end process of the disease, that our pathology is that of the dead house, that we teach medicine as a science of death; in other words, that we should preferably study the patient more as an individual with particular regard to his constitution.

"The thesis concerns the effect of the environment on the patient, but chiefly the immediate environment, namely, the weather and the season."

In Volume I, Part 1, just received, the meteorologic influences on the normal person and the patient are taken up with an interesting review of Hippocrates and his medicine. The author ascribes importance of the season on such diverse conditions as conception, defective teeth, insanity and feeble-mindedness, as well as suicide. The effect of season, climate, etc., on thyroid trouble, diabetes, heart disease, eclampsia, asthma, hay fever, tuberculosis, and poliomyelitis is stressed. And finally, the effect upon the American as contrasted to the European, due to climatic environment, concludes this portion of the volume which contains innumerable maps showing the distribution according to states and climate of the various factors dealt with.

—R. T. Frank

Among the textbooks of medicine, Osler's *Principles and Practice of Medicine*,³² since its first appearance in 1892, has been one of the best known and most widely used. To a large extent the continuation of this popularity is due to the persistent effort of reflecting in every new edition all the progress in information accrued in the meantime. Since Osler's death many of the editions have been supervised most competently by his former collaborator, Thomas McCrae. We trust that his recent untimely death will not cause a noteworthy loss to future editions of this valuable textbook. It therefore proves particularly satisfactory that this last edition has not only been rewritten in several parts, has received many additions dealing with newer discoveries, but also has been completely reset so that much new material is offered within the space of a volume not noticeably increased in size.

—Hugo Ehrenfest

Rosenau's *Preventive Medicine and Hygiene*³³ has long been a generally recognized standard text in its field. With recent stressing of the economic social and the psychologic factors as important forces, preventive medicine and hygiene has become a problem less closely bound up than formerly with the questions of contagious diseases, sewage disposal, water supply, etc. This new volume clearly mirrors these profound changes in the problems of modern preventive medicine. It impresses one with the fact that recent progress in the field of medicine is chiefly along lines of wider appreciation of heretofore neglected or hardly appreciated etiologic factors in the origin of disease. Thus it seems only natural that contraception and maternal mortality appear as newly added subjects. The sections on venereal diseases, sex

³¹*The Patient and the Weather*. By William F. Peterson, M.D. Vol. I. Part 1. The Footprints of Asclepius. 127 pages. Edwards Brothers, Inc., Ann Arbor, Michigan, 1935.

³²*Principles and Practice of Medicine, Designed for the Use of Practitioners and Students of Medicine*. Originally written by the late Sir William Osler. Twelfth edition, revised by Thomas McCrae, Professor of Medicine, Jefferson Medical College, Philadelphia. Pages 1,196 with 22 illustrations. D. Appleton-Century Co. Inc., New York, 1935.

³³*Preventive Medicine and Hygiene*. By Milton J. Rosenau, Professor of Preventive Medicine and Hygiene, Harvard Medical School, etc. Sixth edition, pages 1,479. D. Appleton-Century Company, New York, 1935.

weighing less than 2,500 gm. are assessed as so small and insignificant, that at present in the majority of published statistics on intranatal and neonatal fetal mortality the deaths of infants below this weight are regarded as justifiably deductable from the total loss.

Can this custom be continued in the light of certain facts revealed in these newer studies? Considering the figures of results only for the last three years, 1931, 1932, and 1933, we find:

YEAR	UNDER 1000 GRAMS	1000- 1500	1500- 2000	2000- 2500	ABOVE 2500	TOTAL ADM.	LIVED	DIED	LIVED %
1931									
Lived	0	25	63	72	7	207	167	40	80.7
Died	9	17	7	7	0				
1932									
Lived	2	16	70	86	9	249	184	65	74.0
Died	5	26	28	9	0				
1933									
Lived	5	25	78	48	4	208	160	48	76.9
Died	10	14	17	7	0				

In this tabulation we have a total of 646 infants weighing between 1,000 and 2,500 gm., of whom 490 survived, which represents almost 76 per cent. It seems fair to assert that the obstetrician cannot any longer, for statistical or any other purposes, coolly deny all responsibility for the death of a newborn infant below 2,500 gm. It would be impossible to outline here the relatively simple means by which such truly astonishing results have been achieved. In the main they must be ascribed to the immediate institution of appropriate care which obviously thus has to be supplied by the physician present at birth. However, at least one emphatic statement of Dr. Hess shall be quoted: "A most important period in the life of the premature infant is the time between birth and the institution of some proper method for the prevention of thermal shock. Many of these infants are lost through carelessness in protecting them during the first hours after birth."

These investigations also provide much new information in regard to the relation of intracranial birth injury of the premature infant either to his early death or to later physical and mental deficiencies. Between 1922 and 1934, 350 autopsies were made on babies weighing more than 1,000 and less than 2,500 gm. The pathologic records show 167 instances of intracranial hemorrhage and 8 birth injuries of other types. Furthermore, "in 21 cases autopsy was not permitted, but it was felt that clinical evidence and findings on spinal puncture warranted a diagnosis of intracranial hemorrhage." Thus in this large series, intracranial injuries had caused the death of approximately 40 per cent of prematurely born babies alive when admitted to the service. The total loss from intracranial traumatization, including the stillborn infants and those dying before admission, of course was

hygiene, heredity and eugenics, and infant mortality have been rewritten. Even this brief outline of the scope of this new edition of Rosenau's work can leave no doubt that it will prove also of considerable value and interest to the obstetrician.

—Hugo Ehrenfest

It is the purpose of the Public Health Service in issuing this publication, *Veneral Disease Information*,³⁴ to provide in condensed form a monthly summary of the scientific developments in the diagnosis, treatment, and control of syphilis and gonorrhea. More than three hundred American and foreign journals are reviewed for this work. Abstracts are made of articles describing laboratory, pathologic, and clinical work in the field of venereal diseases.

The most important literature on every phase of the subject is presented in the form of brief abstracts that are easily read. An index for the year is published with the December issue.

The journal is a contribution of the Public Health Service in its program with state and local health departments directed against the venereal diseases.

This book, *Growing Superior Children*,³⁵ will prove of aid to the general practitioner as well as a good guide to the intelligent mother. Its pages are replete with instructive information. The author devotes much space to the feeding and proper clothing problems of early infancy. These are treated with great clarity and detail. The growing child, with his habit-forming and mental and emotional adjustment periods, is philosophically discussed. He is presented as an individual unlike every other child, and an entity of character, psychology, and reactions specific to himself. A wealth of helpfulness may be gleaned from these facts by those who guide the destinies of a new generation. The space devoted to adolescence is short but concise, and though no new truths are uncovered it is valuable information. Above all, the book is written in a clear, interesting, and easy style that holds the attention of the reader from beginning to end. It should be a useful addition to a library for reference.

—Fred L. Adair and S. A. Pearl

A volume on the *Principles of Ethics*³⁶ by Dr. Moore answers the actual problems of a moral nature which may occur in the life of the undergraduate and graduate nurse. The book began in an attempt to answer such questions raised by a group of one hundred nurses who kept diaries over a period of time in which they recorded their daily moral problems and difficulties. In order to provide a solution for the problems of moral life encountered by these girls in their actual nursing experiences, it was found necessary to cover most of the field of applied ethics. The addition of a few other chapters has made a thorough text of ethics. Of particular interest of a practical nature is his very frank discussion of the nurse's responsibility to the physician and to the patient. The chapter on Contracts and Indemnity very definitely explains the responsibilities, moral and legal, involved in caring for the sick. The author attempts to solve, in a very frank manner, the problems of sexual life.

³⁴*Veneral Disease Information* is a monthly publication prepared by the U. S. Public Health Service for distribution among the medical profession throughout the United States. It measures approximately 6 by 9 inches and ranges in size from 25 to 75 pages.

³⁵*Growing Superior Children*. By I. Newton Kirschmose, Attending Pediatrician of the Broad Street Hospital, New York, etc. Illustrated, 565 pages. D. Appleton-Century Co., New York, 1935.

³⁶*Principles of Ethics*. By Dom Thomas Verner Moore, Ph.D., M.D., Monk of the Order of St. Benedict, Professor of Psychology, Catholic University of America, Washington, D. C. 351 pages. J. B. Lippincott Company, Philadelphia, 1935.

mined by the degree of its traumatization in birth. The shape of the soft and elastic cranium of the prematurely expelled fetus is easily and often too quickly altered to a dangerous and disastrous degree. The obstetrician should ever keep in mind that such exaggerated change in configuration can also be effected by the resistance of soft portions of the birth channel, by a not completely dilated cervix, a rigid perineum, or a narrow vulva ring. The obstetrician in the management of a premature labor must refrain from all medication or obstetric measures which tend to hasten the passage of the head and should never hesitate to make a required episiotomy in a primi-gravida.

Incidentally, this report will convince every obstetrician that duplication of the model Premature Infant Station of the Michael Reese Hospital in every large city would effect a considerable lowering of present infant mortality rates.

HUGO EHRENFEST.

Theobald, G. W.: *An Account of Obstetric Methods at St. Mary Abbots Hospital, Kensington, Brit. M. J. 2: 850, 1934.*

In this article the author describes the arrangement of an obstetric and gynecologic unit in a general hospital supervised by himself, and discusses the rules and regulations governing the admission of patients to various sections of the unit, as well as the actual management of the labor ward, the uncomplicated delivery, the difficult case, and the puerperium.

In summarizing his findings, the author states: (1) Over 800 patients were confined without resorting to cesarean section or to induction of labor in the treatment of contracted pelvis or of the toxemias of pregnancy. Twelve out of thirteen infants were born spontaneously with the occiput in the posterior position. The forceps rate was under 3.5 per cent. (2) The morbidity rate was, it is believed, the lowest recorded by any hospital in the country. (3) The methods used in the labor ward can be carried out in any tenement dwelling in the country, no sterile gowns, towels, masks or stockings being required. (4) A maneuver for estimating whether a head can pass through the pelvis is described. (5) It is suggested that rendering the urine alkaline during the puerperium by administration of potassium citrate is of importance in preventing morbidity. (6) A technic for preventing mastitis and breast abscess is given. (7) The value of the prophylactic use of anti-streptococcal serum is stressed. (8) Maternal mortality would be lessened if midwives were not allowed to make vaginal examinations. (9) The increasing maternal mortality rate must be attributed to increased operative intervention. If the present policies are continued, a still further increase may be anticipated during this decade.

F. L. ADAM AND I. C. EDEY.

To the obstetrician and gynecologist who may well read the book with profit, is given the standpoint of the Roman Catholic Church on the morality of certain operations. This is an admirable discussion of the question of criminal abortion, the removal of the pregnant uterus when malignancy is present, the question of surgical interference and ectopic gestation, and the subject of destruction and mutilation of the unborn fetus. The author states that there has been a new orientation of the problem of tubal pregnancy, and the removal of the ectopic pregnancy is now permitted, even though it may be found in the course of an operation where the abdomen has been opened for some other cause. The discussion of contraception follows the principles set down in the recent encyclical of Pope Pius XI on Christian marriage. It is suggested that when the question of contraception arises, the relative sterile period of Ogino-Knauss may be suggested. Regarding sterilization the author brings out arguments exactly opposite to those advanced by the German Reich in the recent promulgation of mass sterilization of undesirables.

The study of this book clearly explains to nurse or physician, Protestant or Catholic, Jew or Gentile, the difference between right and wrong in any act connected with the professional life.

—Philip F. Williams

In this volume on the *Theory and Practice of Anaesthesia*,³⁷ Nosworthy covers in minute detail the technical and clinical features of anesthesia. While it is true that one cannot become an anesthetist by reading a book, nevertheless, a study of this book as one gives anesthesia will serve to make clear the difficulties which may be encountered, and to correct faulty technique as well as to receive suggestions for the elimination and treatment for complications. All types of inhalation anesthesia, the agents, methods and associated medications are described. Nosworthy has used ether as the prime example of inhalation anesthesia, and under this subject has discussed at great length all features of inhalation anesthesia, in order to permit more concise treatment in the following chapters on other inhalation agents. He has an excellent chapter on spinal anesthesia but does not discuss any other branch of regional anesthesia. Basal hypnotics and other methods of premedication are considered in conjunction with nitrogen oxide oxygen anesthesia. The chapter on choice of anesthetic should be of particular interest to the operator, since his is the final word regarding the agent to be used. Nosworthy suggests there be a preoperative consultation between the surgeon and the anesthetist. He regards chloroform as almost fool-proof in obstetrics but mentions its disadvantages in the intoxications of pregnancy. Nosworthy states, however, that nitrous oxide oxygen is without doubt the best anesthetic for obstetrics, as it has a quick induction and does not inhibit uterine contractions. He discusses the use of carbon dioxide in asphyxia and warns against the use of excessive rebreathing which might possibly lead to premature inspiration by the fetus.

This book is thorough and complete and should be of considerable help to those who are taking up this branch of medicine.

—Philip F. Williams

The author, Dr. Hayner, felt during his twelve years of teaching a necessity for a different type of book on *Regional Anatomy*.³⁸ He has prepared a text on regional anatomy in strictly descriptive form and without any illustrations. The book does not give any directions for dissection, nor does it purport to be a surgical anatomy in

³⁷*Theory and Practice of Anaesthesia*. By M. D. Nosworthy, M.D., Anaesthetist to Westminster Hospital, Grosvenor Hospital for Women, etc. With 35 illustrations, 224 pages. Hutchinson's Scientific Publications. London, E. C. 4., 1935.

³⁸*Regional Anatomy, Adapted to Dissection*. By J. C. Hayner, Associate Professor of Anatomy, Metropolitan Hospital, New York, etc. 637 pages. William Wood & Company, Baltimore, 1935.

and is not a general body stimulating agent. This limitation of estrogenic activity to only secondary sexual tissue, breast, uterus, vagina, and tubes, explains the conflicting results reported concerning its action in experimental cancer; yet full cognizance of such is not generally recognized. The estrogenic hormone stimulates the rate of growth of experimental mammary cancer, and may even produce breast cancer in mice⁹ (this observation has neither been repeated nor confirmed), yet its action is ineffective on the rate of growth of animal sarcoma and skin cancer. It is this specific and limited character which distinguishes the action of the estrogenic hormone from the carcinogenic factor.

Burrows¹⁰ failed to demonstrate a carcinogenic action of the estrogenic hormone by applying it directly to the skin of mice over a long period of time; this method has been found effective with the carcinogenic hydrocarbons of tar. There is at present no evidence for the origin of carcinogenic compounds developing in the animal body from the estrogenic hormone.¹¹ Loeb, however, has demonstrated the interaction of certain cancer hereditary factors in mice and the estrogenic hormone acting as a stimulant to tissue growth as the igniting factor for mammary cancer, the most frequent tumor in this species.²

As far as the etiology of cancer is concerned, the carcinogenic compounds, acting as growth stimulants, may induce malignant growth formation without first causing local irritation or tissue hypertrophy.² Nor are these compounds selective as to the substratum in which they act, since they produce epithelial cancer when applied directly to the skin of the animal over a long period, and sarcoma when injected subcutaneously. The agents apparently effect changes in the cells on which they act, and these changes ultimately result in cancer formation from originally normal cells.

UTERINE FIBROIDS

Recent investigations on granulosa cell tumors, associated with disturbances in the available supply of the estrogenic hormone, have reflected precocious development of the secondary sexual organs in young girls.¹² Also multiple follicle cysts of the ovary, with no corpora lutea, and apparently excess estrogenic activity, have been found associated consistently with endometrial hyperplasia and uterine fibroids.¹³ In view of the close relation between the carcinogenic and estrogenic principles, this seems particularly significant.

That stimulation by the estrogenic hormone causes myometrial hypertrophy and hyperplasia has been frequently noted. Dodds,¹⁴ Clauberg,¹⁵ and others have produced uterine enlargement in women, from infantile to adult size, by the administration of large doses, 500,000 to 1,000,000 R.U., of the estrogenic hormone. Only clinical observations, since uterine fibroids are comparatively rare in the lower animals, have warranted the hypothesis that if estrogenic stimulation is prolonged sufficiently, uterine fibroids will develop, in addition to myometrial hyperplasia. In several former communications,^{13, 16-18} from a clinical and pathologic study the relationship of endometrial hyperplasia and increased activity of the estrogenic hormone, in the absence of any corpora lutea influence, was noted. At the same time it was suggested that the myometrium was also affected by the excessive estrogenic action, especially so in view of the fact that this stimulation was abnormally great. A further hypothesis was advanced: if this estrogenic activity was prolonged sufficiently, because fibroids are slow growing tumors, the result would be (1) immediate endometrial changes characterized by hyperplasia, and (2) more latent myometrial pathology as uterine fibroids. The clinical and pathologic data on 282 cases of uterine fibroids were presented to substantiate this hypothesis. Lewis and Geschickter¹⁷ have demonstrated the presence of the estrogenic principle in a uterine myoma.

an application of anatomical relationship and pathologic processes. The Basle Nomenclature has been used, as well as the original Latin names of the anatomical structures, with accompanying anglicized forms, a method which should accustom the student with the most common use of terminology.

While this type of Regional Anatomy in a purely descriptive manner is undoubtedly very satisfactory in many respects, it is a little disconcerting to find the subject of the fetal circulation discussed as to the abdomen in the early part of the book, and later on, many pages distant, in the thorax. The author regards the perineum anatomically rather than obstetrically, as do most anatomists, and his descriptions of the pelvic organs, muscles, and fascia in the female leave little to be desired.

Representing as it does a new style of anatomy, not a descriptive manuscript of surgical anatomy or an ordinary textbook, it will very likely be found of value to those needing this type of book.

—Philip F. Williams

The chief purpose of these studies, *The Human Foot*,³⁹ by Morton, has been to identify and analyze the primary factors of functional disorders of the foot.

The book is divided into three parts. The first deals with the evolutionary changes and other factors such as alteration in body size and gradual development of the brain, which slowly modified the foot from its earliest form. The changes in the foot under slowly changing conditions in the primates and anthropoids up to man, where the vertical position of the body is customary, reflect the physiologic adaptations of this member. Morton remarks, "The attainment of the upright posture through brachiation and the transfer of the leverage axis to the inner border of the foot were among the final and most important arboreal contributions which mankind has received from his ancestry; common with lower groups."

The physiology of the foot, the second part of the book, discusses the function of the foot in relation not only to weight bearing but to locomotion, both in walking and running. It is pointed out that the modifications of the foot, position and elevation of the arch have resulted from direct biologic response to the stresses placed upon it. The conception of an anterior transverse metatarsal arch is refuted. It is shown that a mild out-toeing, from a physiologic aspect, may be regarded as the position of greatest efficiency.

In considering the various functional disorders of the foot, the final section of the book, it is felt that they should be considered more in terms of work done by the different parts of the foot than solely by a consideration of form and posture. Disorders of the longitudinal arch and the metatarsal region are most thoroughly analyzed as to etiology, method of study, the associated factors and treatment.

Of interest, especially to the obstetrician, is the reference to the influence of sex as a factor in functional foot ailments. The use of abusive footwear by women is held responsible for the wide ratio between men and women in such disorders. To which may be added the presence of pregnancies, and the possibility of a physiologic laxation of the joints of the foot similar to that of the pelvic joints seen in pregnancy. The concluding chapter of the book on the general problem of foot welfare reveals not only the wide prevalence of foot disorders but the lack of proper attention often paid to them.

While the book may be regarded as primarily intended for orthopedists, it will be of interest and value to many in other branches of the profession as a record of human evolution and comparative morphology.

—Philip F. Williams

³⁹*The Human Foot. Its Evolutionary Development, Physiology and Functional Disorders.* By Dudley J. Morton, Associate Professor of Anatomy, College of Physicians and Surgeons, Columbia University. 214 pages. Columbia University Press, New York, 1935.

CANCER OF THE FEMALE GENITAL ORGANS

The activity of the estrogenic hormone as a growth promoting agent on the female generative organs is similar to its action on the mammary glands. In malignancy of the genital viscera, therefore, estrogenic activity should be eliminated, and this usually is the case. In cancer of the cervix sufficient dosage of radium is used to induce cessation of all ovarian and estrogenic activity. Also in malignancy of the fundus, the uterus, tubes, and ovaries are generally removed and thus the estrogenic element is destroyed. In ovarian carcinoma the estrogenic hormone activity is probably ineffective as a growth stimulant, since this organ is not under its direct influence. Surgery and deep x-ray therapy to the ovaries, however, will usually remove its effect. On the other hand, cancer of the vulva, when treated surgically, should have the estrogenic activity removed, similar to its elimination in mammary malignancies.

CANCER AND THE ANTERIOR PITUITARY GROWTH FACTOR

That the anterior hypophyseal growth promoting principle plays an important rôle on the growth rate of animal malignancy has been repeatedly demonstrated. Many observers,²¹⁻²⁴ have produced in animals retardation of carcinoma and sarcoma growth rates by hypophysectomy. If hypophysectomy is performed after the development or implantation of the tumor, there is an immediate reduction in the neoplastic growth rate, but no complete cessation of growth occurs. This operation also leads to cessation of body growth. If hypophysectomy is done two or three weeks before inoculation, the retardation of growth is most effective. On administering the anterior pituitary growth principle to these hypophysectomized animals, the tumor and body growth rates are immediately increased.

Zondek²⁵ and others,²⁶ using the antagonistic relationship hypothesis between the anterior pituitary growth and sex factors,²⁷ have inhibited animal malignancy growth rates by administering the pregnancy urine hormone.

Bischoff^{24, 25} has demonstrated that after sublethal pituitary irradiation the rate of growth of rat sarcoma 10, rat carcinoma 256, mouse carcinoma (spontaneous mammary) and mouse sarcoma 180 is significantly retarded, but the effect is observed only when body growth is virtually arrested. Moreover, the effect on the tumor growth rate is transient, and massive dosages of irradiation are required to produce the necessary retardation of body growth. In animals whose body growth weights are arrested by poisons, no retardation effect was noted on the tumor growth.

On the other hand, the increased effect of the growth promoting principle of the anterior lobe on three of the above tumors was marked (the difference between the tumor growth of dosed and controlled animals equaling three times the joint standard deviation of the mean). This effect of the growth promoting principle was less marked in sarcoma than in carcinoma bearing rats and mice.

If the retardation of body and tumor growth rates, following pituitary irradiation, is due to inhibition of activity or lack of production of the anterior hypophyseal growth factor, the administration of this growth principle to animals so treated should result in an acceleration of both body and tumor growth rates. Bischoff²⁴ produced this accelerating body and tumor growth rate effect on rats with carcinoma 256 by daily administering the growth promoting principle, after the animals had been given extensive pituitary irradiation.

The mere fact that this work, *Aids to Surgery*,⁴⁰ by Joll and Ledlie, appears in its sixth edition is certain evidence of its usefulness. The first edition appeared in 1904. The authors state they have enlarged the book, and have added quite a number of illustrations in order to make it not only of use to the students, as originally intended, but to the practitioners as well. To carry out this aim they have gone into more detail in this edition, in treatment of minor surgical conditions commonly met with by the general practitioner. The book covers the whole field of surgery in a brief, concise text and an enormous amount of material appears to be compressed, by small print and thin paper, into 569 pages. Its size will enable it to be easily carried in a pocket or surgical bag.

—Philip F. Williams

This medical anthology, *For and Against Doctors*,⁴¹ is a piquant mixture of censure and praise gathered through all times, from the disparaging fables of Æsop to the modernistic quips of George Bernard Shaw. The correspondence and interest shown after the use of some of the material in the McAlister lecture, 1934, prompted the authors to amplify their collection to the present form.

There is bitter contempt, derisive scorn, and ironic jealousy, there is merited praise, personal appreciation and sympathetic understanding of the profession ranging from the musty Chinese proverb, "Medicine is one of the nine low trades," to Stephen Paget's, "If a doctor's life may not be a divine vocation, then no life is a vocation and nothing is divine." And between these, Plutarch, Seneca, Virgil, Pliny, Petrarch, Roger Bacon, Moliere, Shakespeare, Chaucer, René Descartes, and Chesterton show the gratitude or disregard in which the medical profession has been placed in song and story, verse and prose during the ages.

—Philip F. Williams

Dr. Braude in his short book, *Life Begins*,⁴² has added a brief résumé to much that has been written on the subject of childbirth in ancient times and the multitude of curious customs and traditions that became attached to a physiologic process unapprehended by the ancients. Such material affords interesting reading and amusing entertainment for those who seek a historical background to our civilization, and are fascinated by the primitive and weird practices.

The cause of the actual onset of labor, the author explains, though answered in many ways even today, was attributed by primitive peoples to the entry of the "shadow soul" of the child into the sexual organs of a woman just before lying-in. Being uncomfortable "in the womb where it is hot and suffocating, and which it stirs to activity in order to release it." The Babylonians explained the same phenomenon by a "myth in which the pangs of labor were attributed to the sin of some pre-existing heroine."

Such are the numerous, intriguing and quaint incidents pertaining to childbirth and the newborn as found in many books, but gathered into a compact concise form in a facile manner by the author.

—S. A. Pearl

⁴⁰*Aids to Surgery.* By Cecil A. Joll, Senior Surgeon to the Royal Free Hospital, etc., and Reginald C. B. Ledlie, Surgeon to Miller General Hospital, etc. Illustrated by H. H. Greenwood, Consulting Surgeon, G. W. R. Hospital, Swindon. Sixth edition. William Wood & Company, Baltimore, 1935.

⁴¹*For and Against Doctors.* An Anthology. Compiled by Robert Hutchison and G. M. Wauchope. 168 pages. William Wood & Company, Baltimore, 1935.

⁴²*Life Begins. Childbirth in Lore and in Literature.* By Morris Braude, Associate Professor of Psychiatry, Rush Medical College, University of Chicago. 163 pages. Argus Books, Chicago.

Selected Abstracts

Pathologic Puerperium

Paine, C. G.: The Etiology of Puerperal Infection, Brit. M. J. 1: 243, 1935.

Hemolytic streptococci cause the greater number of puerperal infections. The author describes a mode of study of droplet infection and concludes that the organism is conveyed to the patient by the hands of the attendant, direct spraying from nose and throat, or by patient's own hands. The obstetric attendant may carry infection from some other case, by the hands harboring hemolytic streptococci in a trivial lesion, by the hands soiled from pocket handkerchiefs, or by his hands being infected through low momentum droplets from his own throat.

Precautionary measures consist in masks of suitable thickness being well secured under the chin and a rigid hand technic. Masking should be done before any preparations for operation are begun. Bacteriologic control of cases is stressed. Carriers should be guarded rigidly.

F. L. ADAIR AND S. A. PEARL.

Horn, L. L.: Etiology of Puerperal Fever, Monatschr. f. Geburtsh. u. Gynäk. 95: 43, 1933.

In the opinion of Horn, coitus is to be restricted during the first three months of pregnancy since it may cause an abortion. It must be entirely eliminated after the eighth month because it may not only start labor pains in primiparas but may directly cause rupture of the membranes in multiparas and thus lead to premature labor. Coitus just before labor endangers the pregnant woman because there have been reported instances of puerperal sepsis as the direct result of intercourse at this time. In some instances death resulted. The author reports three cases of severe puerperal sepsis observed in the Breslau clinic in all of which the causative factor was coitus just before labor.

J. P. GREENHILL.

Contardo, G. B.: The Bacterial Flora and the Bactericidal Action of the Lochia of the Normal Puerpera, Folia gynaec. 30: 557, 1933.

From a careful study of lochia Contardo concludes that their bactericidal action is greatest during the first two days after delivery. As the bactericidal action diminished he observed the ascension of germs from the vagina into the uterus. In the normal puerpera he found the following organisms predominating: Döderlein's bacillus, *Staphylococcus albus* and *aureus*, streptococcus, nonhemolytic type, saprophytic forms.

He does not believe that these organisms cause puerperal infection, but does believe that their growth and ascension are inhibited by the lochia.

J. M. PIERCE.

The author gives advice to the expectant mother in the care of herself and her new baby in a sound and facile manner. The brevity of the book, *Four New Baby*,⁴³ on a subject of vast importance and detail, indicates the careful sifting process the material has been subjected to, and only the main points presented clearly. This book should prove especially valuable to women in outlying rural districts, and to those away from large centers, when they are unable to obtain adequate prenatal care, and where preparations for a home delivery are pending. Much practical help may be obtained from its pages in the preparation for and in the rearing of the very young infant.

The simple kindly way in which much of the subject is presented is a boon to expectant mothers and adds a lesson in getting them to abandon fear and prepare for motherhood in a joyful, relaxing manner. In describing the Birth, Miss Wood tells: "As far as your baby's actual arrival is concerned, it is, and should be, a more or less hazy experience which you seldom remember. . . . All that you have to concern yourself with is cooperating with the doctor and nurses who are trying to help you. . . . Do not be afraid. . . ." These lines in themselves indicate the fear and apprehension with which too many a mother approaches her labor. Any work that can annihilate such unhealthy emotions is a contribution to the literature on the subject.

The chapters on the care of the baby are studded with many practical answers to questions the young mother either seeks over the telephone wires from her doctor or friends or which too often to her remain a mystery unopened and unsolved.

—S. A. Pearl

The chief merit of this little book, *Mother and Baby Care in Pictures*,⁴⁴ is its simple text and abundant illustrations. It gives concise and exact information concerning prenatal hygiene, preparation for and conduct of home confinement, and in somewhat greater detail, instruction as to care of the infant during the first year of life. There are chapters on the prenatal period, mother's clothes, baby's clothes, nursery needs, preparations for confinement, delivery, the baby's bath, weighing and dressing the baby, the baby's general care, feeding, habits, the baby's development, preventive care, toddler's clothes, common pre- and postpartum complaints, and female pelvic anatomy.

The pictures are for the most part well-selected and instructive. The text is conservative, clear, and explicit, adapted to the needs of women whose circumstances require them to take care of the baby themselves. A commendable feature of the book is its thoroughgoing attempt to answer a majority of the questions arising in the minds of prospective and nursing mothers, and to accomplish this purpose in a systematic, rather entertaining manner. It may be recommended with confidence that it will be useful, particularly to young primigravidas.

—Fred L. Adair

⁴³*Your New Baby. How to Prepare for It, How to Care for It.* By Linda McClure Woods, R.N. Illustrated. Robert M. McBride & Co., New York, 1935.

⁴⁴*Mother and Baby Care in Pictures.* By Louise Zabriskie, R.N., Formerly Night Supervisor Lying-in Hospital, New York City; Field Director Maternity Center Association, New York City. With 187 illustrations; 196 pages. J. B. Lippincott Company, Philadelphia, 1935.

sepsis cases were given blood from pregnant women and good results were obtained. Other measures employed were injection of the patient's own blood, injections of glucose, of insulin and of alcohol. The author will continue his expectant treatment in the future.

J. P. GREENHILL.

Batisweiler, J.: The Significance of Chills in the Prognosis of Puerperal Fever, *Monatschr. f. Geburtsh. u. Gynäk.* 95: 56, 1933.

Batisweiler points out that chills are frequently the first symptoms of septic infections of genital origin. They may be used to differentiate the various forms of septic processes, they may furnish the indication for surgical measures such as ligation of veins, and above all they may be used for the prognosis of the individual case. The number of chills is significant. If a patient has only one to three chills, the prognosis is favorable, for the mortality is low. Beginning with the fourth chill, the death rate rises suddenly. The time of onset of the first chill is significant. Usually the first chill occurs in the first week after delivery. It begins early in cases where there will be a large number of them. Hence the later the first chill sets in, the better the outlook. The more rapidly the chills recur, the worse the prognosis. The more days which intervene between the chills, the better the chances for recovery. The longer fever lasts after labor or abortion without the occurrence of chills, the more infrequent are the latter. The morbidity is greater in operative cases than in those who have spontaneous deliveries, and abortions stand about midway between these two.

J. P. GREENHILL.

Menzel, U.: Metastases in Puerperal Sepsis, *Monatschr. f. Geburtsh. u. Gynäk.* 99: 204, 1935.

The author studied a series of 218 cases of puerperal sepsis of which 127 ended fatally and 188 were complicated by metastases. The latter figure indicates the very high incidence of metastases in cases of puerperal sepsis. Practically every organ in the body may be the site of metastases in cases of sepsis. The organs chiefly involved were the lungs, kidneys and the heart in the order named. The most common organisms found were the *Streptococcus hemolyticus*, the staphylococcus, and the gas bacillus. It is important to recognize the responsible organisms in order to form a proper prognosis. The three organisms just named lead to death in most cases. The author maintains that the hemotogenous route for metastases is more rapid, more frequent, and more fatal than the lymphatic route.

Every metastasis, regardless of how it arose or in which organ it is situated, is an abscess or an area of necrosis. Metastases occur with equal frequency in sepsis following either abortion or full-term labor.

J. P. GREENHILL.

Goecke, H.: Hemorrhages in the Puerperium, *Monatschr. f. Geburtsh. u. Gynäk.* 94: 151, 1933.

INDEX TO VOLUME 31

AUTHORS INDEX*

A

- ABEL, ARTHUR R., (WITH POTTER, RAYMOND T.), A study of surface bacteria of newborn and comparative values of cleansing agents, 1003
- ACOSTA-SISON, H., On origin of amniotic fluid, 139
- ADAMSON, G. NORMAN, Septate vagina complicating labor, 676
- ALLEN, EDWARD, AND BAUER, CARL P., The influence of medical diseases on obstetric and fetal mortality, 885
- ANGELUCCI, HELEN M., Trichomonas vaginalis vaginitis, 1020
- AUER, EUGENE S., The effects of x-ray and radium on cancer of cervix, 790

B

- BAKER, M. H., (WITH CASHMAN, B. Z.), Massive blood transfusions during abdominal operations, 240
- BARER, ADELAIDE P., AND FOWLER, W. M., The blood loss during normal menstruation, 979
- BARROWS, DAVID N., Kirschner-Wagner operation for construction of artificial vagina, 156
- BARTHOLOMEW, R. A., AND KRACKE, R. R., Probable rôle of hypercholesterolemia of pregnancy in producing vascular changes in placenta predisposing to placental infarction and eclampsia, 549
- BARTLETT, MARSHALL K., (WITH ROCK, JOHN), Treatment of amenorrhea, 634
- BAUER, CARL P., (WITH KANTER, AARON E., AND KLAWANS, ARTHUR H.), Hormonal studies with ovipositor lengthening reaction of Japanese bitterling, 764
- , (WITH ALLEN, EDWARD), The influence of medical diseases on obstetric and fetal mortality, 885
- BERNSTINE, J. BERNARD, AND OTTEN, RALPH EDWARD, Vaccination during pregnancy as a prophylaxis against puerperal infections, 37
- BLACK, WILLIAM T., Abscess of ovary, 487
- BOURLAND, J. W., The value of Trendelenburg position for occult prolapse of cord, 1043
- BREWER, JOHN I., (WITH EDWARDS, E. A., AND JONES, H. O.), A normal human ovum in a stage preceding primitive streak, 672
- BROWN, T. K., (WITH SCHWARZ, OTTO H.), Puerperal infection due to anaerobic streptococci, 379

- BROWN, W. E., (WITH MULSOW, F. W.), Peptic ulcer complicating pregnancy, 1041
- BRUNTSCHWIG, ALEX., (WITH DAVIS, M. EDWARD), The roentgenotherapy of chorionepithelioma, 987
- BUNIM, JOSEPH J., (WITH STONE, MELVIN L.), Cutaneous hemorrhage during puerperium with later development of acute yellow atrophy, 1015
- BITTSCH, WINFIELD L., (WITH COUNSELLER, VIRGIL S.), Double malignant tumors of uterus, 628
- BENBAUM, HENRY, Out-patient obstetrics, 409
- BUNTON, C. LEE, (WITH SCHWARTZ, HENRY G.), The effect of sympathetic denervation upon ovulation and estrus in rat, 132

C

- CAMPBELL, ALEXANDER MACKENZIE, The effect of excessive cigaret smoking on maternal health, 502
- CAMPBELL, RALPH E., AND HISAW, FREDERICK L., The use of corpus luteum in treatment of dysmenorrhea, 508
- CASHMAN, B. Z., AND BAKER, M. H., Massive blood transfusions during abdominal operations, 240
- CHIPMAN, WALTER W., In memoriam, Charles Jefferson Miller, 731
- COLLINS, CONRAD G., THOMAS, E. PERRY, AND MENVILLE, LEON J., Irradiation of pituitary gland in treatment of menopausal symptoms, 115
- CORSCADEN, JAMES A., (WITH MILLER, JAMES R., AND HARRAR, JAMES A.), The effects of radiation on human offspring, 518
- COSGROVE, S. A., Occipitoposterior positions, 402
- COUNSELLER, VIRGIL S., AND BITTSCH, WINFIELD L., Double malignant tumors of uterus, 628

D

- DAICHMAN, ISIDORE, AND SHIR, MARTIN M., Sodium amytal and morphine in labor, 515
- DANNERKUTHER, WALTER T., Mucocoele of vermiform appendix, 342
- DAVIS, M. EDWARD, AND BRUNTSCHWIG, ALEX., The roentgenotherapy of chorionepithelioma, 987
- DE CARLE, DONALD W., Incidental blindness in pregnancy, 929
- DELLINGER, S. C., AND WAKEFIELD, ELMER G., Obstetric effluvia of mound builders of eastern Arkansas, 653

*January, pp. 1-186; February, pp. 187-368; March, pp. 369-548; April, pp. 549-730; May, pp. 731-910; June, pp. 911-1096.

Item

American Board of Obstetrics and Gynecology

The next written examination and review of case histories of Group B applicants for certification by this Board will be held in various cities of the United States and Canada on Saturday, March 28, 1936. Group B applications must be filed in the Secretary's office not later than February 28, 1936.

The oral, clinical, and pathological examination of all candidates for certification by this Board will be held in Kansas City on Monday, May 11, and Tuesday, May 12, 1936, immediately prior to the scientific session of the American Medical Association. Applications for Group A candidates must be received not later than April 1, 1936.

The annual informal dinner and general conference of Diplomates attending the American Medical Association convention will be held at Hotel Kansas Citian, Kansas City, Missouri, Wednesday, May 13, at 7:00 P.M. At this dinner the successful candidates from the examinations of the two preceding days will be presented in person, and short addresses will be made by several members of the Board.

For further information, booklets, and application blanks, apply to the Secretary, Dr. Paul Titus, 1015 Highland Building, Pittsburgh (6), Pennsylvania.

LIST OF DIPLOMATES LIMITING THEIR PRACTICE TO OBSTETRICS AND / OR GYNECOLOGY TO DATE, SEPT. 1, 1935

ALABAMA

DOUGLAS, G. F., BIRMINGHAM
GARRISON, J. E., BIRMINGHAM

ARKANSAS

HINKLE, S. B., LITTLE ROCK

CALIFORNIA

ABRAMSON, M. J., LOS ANGELES
AINLEY, F. C., LOS ANGELES
BELL, T. F., OAKLAND
BIERNSTEIN, ABRAHAM, SAN FRANCISCO
COLEMAN, D. D., ALHAMBRA
CRABE, R. G., SAN FRANCISCO
DECARLE, D. W., SAN FRANCISCO
EMGE, L. A., SAN FRANCISCO
FALLAS, R. E., LOS ANGELES
FIST, H. S., LOS ANGELES
FLUCHMANN, C. F., SAN FRANCISCO
GREENBAUM, G. B., LOS ANGELES
HARLEY, B. J., LOS ANGELES
HOLMES, O. M., SAN MATEO
IRWIN, J. C., LOS ANGELES
JOHNSON, O. H., LOS ANGELES
KANNER, H. M., SACRAMENTO
KRABUEHL, E. J., LOS ANGELES
LEWALD, H. M., LOS ANGELES
LEVINE, C. H., SANTA MONICA
LANE ENFORD, FRED, LOS ANGELES

LOOMIS, F. M., OAKLAND
LYNCH, F. W., SAN FRANCISCO
MCNEILLE, L. G., LOS ANGELES
MAXWELL, ALICE F., SAN FRANCISCO
MOORE, W. G., SAN FRANCISCO
NEWMAN, H. P., SAN DIEGO
PAGE, C. W., BERKELEY
PETTIT, A. V., SAN FRANCISCO
PIERCE, S. N., LOS ANGELES
ROONEY, H. M., LOS ANGELES
ROSS, M. H., LOS ANGELES
SALISBURY, C. S., LOS ANGELES
SHAW, H. N., LOS ANGELES
SHERRICK, J. W., OAKLAND
SHUFFELT, A. A., SAN JOSE
SLEMONE, J. M., LOS ANGELES
SPALDING, A. H., SAN FRANCISCO
STEPHENSON, H. A., SAN FRANCISCO
THOMPSON, W. B., LOS ANGELES
TIER, L. J., LOS ANGELES
TOLLEFSON, D. G., LOS ANGELES
VOLLMER, A. M., SAN FRANCISCO
VREWINK, JOHN, LOS ANGELES
WILLIAMS, N. H., LOS ANGELES

COLORADO

INGRAHAM, C. H., DENVER
LOWELL, CUTHBERT, DENVER
WEINER, MORRIS, DENVER

- DENORMANDIE, ROBERT L., Premature separation of placenta in private practice, 325
- DERSHIMER, FREDERICK W., The influence of mental attitudes in childbearing, 444
- DICKINSON, ROBERT L., In memoriam, George Gellhorn, 369
- DIECKMANN, WILLIAM J., Blood chemistry and renal function in abruptio placentae, 734
- DOLL, EDGAR A., Behavioral consequences of cerebral birth lesions, 866
- DOUGLASS, MARION, Operative treatment of urinary incontinence, 268
- DRANE, WALTER H., The treatment of incomplete abortion, 1029
- DUNCAN, CAMERON, Interstitial radiation of cervix, with suggested modification of Taussig's operation, 623

E

- EASTMAN, NICHOLSON J., Fetal blood studies, 563
- EDWARDS, E. A., JONES, H. O., AND BREWER, JOHN I., A normal human ovum in a stage preceding primitive streak, 672
- EHRENFEST, HUGO, The premature infant, 169

F

- FLUHMANN, C. F., Period of puberty and inception of menstruation, 573
- FOWLER, W. M., (WITH BARER, ADELAIDE P.), The blood loss during normal menstruation, 979
- FREYBERG, R. H., GILLARD, JAMES L., AND GANESBAUER, FERDINAND, A comparison of different methods for measuring renal function during pregnancy, 511

G

- GANESBAUER, FERDINAND, (WITH FREYBERG, R. H., AND GILLARD, JAMES L.), A comparison of different methods for measuring renal function during pregnancy, 511
- GARNETT, A. Y. P., AND JACOBS, J. BAY, Pelvic inclination, 388
- GELLHORN, GEORGE, Argyria uteri, 613
- , Primary squamous cell carcinoma in body of uterus, 372
- GILLARD, JAMES L., (WITH FREYBERG, R. H., AND GANESBAUER, FERDINAND), A comparison of different methods for measuring renal function during pregnancy, 511
- GNARSEL, A. M., Multiple arrhenoblastoma of ovary, 125
- GOLDBERG, MAX M., Acroparesthesia, 161
- GORDON, CHARLES A., The reduction of mortality in ectopic gestation, 280
- GORDON, H., (WITH RONGY, A. J., AND TAMIS, A.), Uterine bleeding, 300
- GRAP, HERMANN, Personal record of hysterectomies performed during a period of five years, 150
- GRAY, LAMAN A., (WITH NOVAK, EMIL), Clinical and pathologic differentiation of certain special ovarian tumors, 213
- , AND WINTROBE, M. M., Chronic hypochromic anemia in women, 2
- GREBENC, LUCILE, (WITH HERRICK, W. W., AND TILLMAN, ALVIN J. B.), The mild toxemias of late pregnancy, 832

- GREENE, HARRY J., Adenocarcinoma of supernumerary breasts of labia majora in case of epidermoid carcinoma of vulva, 660
- GREENHILL, J. P., Fibromyoma of cervix uteri; three cases; one developing in cervical stump after hysterectomy, 678
- , AND SCHMITZ, HERBERT E., Intraspinal alcohol injections and sympathectomy for pain associated with carcinoma of cervix, 290

H

- HAMBLIN, E. C., Large intramural cysts of uterus with report of a case, 530
- , AND ROSS, R. A., A study of ovaries following preoperative administration of an extract of pregnancy urine, 14
- HARRAR, JAMES A., (WITH MILLER, JAMES R., AND CORSCADEN, JAMES A.), The effects of radiation on human offspring, 518
- HARRIS, L. J., MENGERT, WILLIAM F., AND PLASS, E. D., Mechanics of uterine support and position, 1009
- HARVEY, HARRY EVANS, Premature separation of placenta and circulatory collapse associated with pericardial effusion, 803
- HERRICK, W. W., TILLMAN, ALVIN J. B., AND GREBENC, LUCILE, The mild toxemias of late pregnancy, 832
- HILTON, JOSEPH J., Arachnoidism in pregnancy, 159
- HISAW, FREDERICK L., (WITH CAMPBELL, RALPH E.), The use of corpus luteum in treatment of dysmenorrhea, 508
- HOFBAUER, J., Correspondence, 547
- HUNT, ARTHUR B., AND MCGEE, WILLIAM B., Dührssen's incisions, 598

I

- IRVING, FREDERICK C., The vascular aspect of eclampsia, 466

J

- JACOBS, J. BAY, (WITH GARNETT, A. Y. P.), Pelvic inclination, 388
- JACOBS, MAURICE S., The heart in uterine myoma, 483
- JACOBY, ADOLPH, The treatment of pelvic inflammation by iontophoresis of acetyl-beta-methylcholine-chloride, 93
- , AND RABBINER, BENJAMIN, Treatment of senile vaginitis with estrogenic hormones, 654
- JAMESON, EDWIN M., The influence of collapse therapy in treatment of pulmonary tuberculosis on menstrual physiology, 30
- JONES, H. O., (WITH EDWARDS, E. A., AND BREWER, JOHN I.), A normal human ovum in a stage preceding primitive streak, 672

K

- KANE, HOWARD F., AND PABERT, HOWARD P., An analysis of 569 forceps operations, 657
- KANTER, AARON E., BAUER, CARL P., AND KRAWANE, ARTHUR H., Hormonal studies with ovariopar lemethene reaction of Japanese bitter-bog, 764

MICHIGAN

BELL, J. N., DETROIT
 CUMMINGS, H. H., ANN ARBOR
 HUBER, C. P., ANN ARBOR
 KAMPERMAN, GEORGE, DETROIT
 KENNEDY, R. B., DETROIT
 KRETZSCHMAR, N. R., ANN ARBOR
 MACK, H. C., DETROIT
 MILLER, N. F., ANN ARBOR
 NELSON, H. M., DETROIT
 SEELEY, W. F., DETROIT
 WALSER, H. C., DETROIT
 WHITE, MILO R., DETROIT
 YATES, H. W., DETROIT

MINNESOTA

BARRY, L. W., ST. PAUL
 CONDIT, W. H., MINNEAPOLIS
 EHRENBURG, C. J., MINNEAPOLIS
 LAVAKE, R. T., MINNEAPOLIS
 LITZENBERG, J. C., MINNEAPOLIS
 MALAND, C. O., MINNEAPOLIS
 MANLEY, J. R., DULUTH
 MUSSEY, R. D., ROCHESTER
 RANDALL, L. M., ROCHESTER
 ROTHROCK, J. L., ST. PAUL
 SCHULZE, A. G., ST. PAUL
 SWANSON, R. E., MINNEAPOLIS

MISSOURI

ASCHMANN, T. H., KANSAS CITY
 CALKINS, L. A., KANSAS CITY
 CROSSEN, H. S., ST. LOUIS
 CROSSEN, R. J., ST. LOUIS
 DORSETT, E. L., ST. LOUIS
 DRABKIN, CHARLES, ST. LOUIS
 EHRENFEST, HUGO, ST. LOUIS
 GELBHORN, GEORGE, ST. LOUIS
 GUFFER, D. C., KANSAS CITY
 HAMILTON, B. G., KANSAS CITY
 HANNA, M. A., KANSAS CITY
 JAMES, J. D., SPRINGFIELD
 *KERWIN, WILLIAM, ST. LOUIS
 KREBS, O. S., ST. LOUIS
 MCNALLEY, F. P., ST. LOUIS
 NEWELL, Q. U., ST. LOUIS
 O'NEILL, J. B., ST. LOUIS
 PADDOCK, RICHARD, ST. LOUIS
 ROBBER, M. A., ST. LOUIS
 ROYSTON, G. D., ST. LOUIS
 SCHWARZ, HENRY, ST. LOUIS
 SCHWARZ, O. H., ST. LOUIS
 SINGLETON, J. M., KANSAS CITY
 SWAHLEN, P. H., ST. LOUIS
 TAUSSIG, F. J., ST. LOUIS
 VAN DEL, D. T., KANSAS CITY
 VOGT, W. H., ST. LOUIS
 WILSON, R. R., KANSAS CITY

NEBRASKA

FINDLEY, PALMER, OMAHA
 LEIKART, RALPH, OMAHA
 SAGE, E. C., OMAHA

NEW JERSEY

BINGHAM, A. W., EAST ORANGE
 CONAWAY, W. P., ATLANTIC CITY
 COSGROVE, S. A., JERSEY CITY
 DIACHERNO, P. A., UNION CITY
 DARNALL, W. L., ATLANTIC CITY
 HALL, P. O., JERSEY CITY
 HILL, E. J., NEWARK
 MACKENZIE, R. A., ASBURY PARK
 MOUNT, W. D., MONTCLAIR
 NORTON, J. F., JERSEY CITY
 PURDY, W. R., MONTCLAIR
 WALKER, R. B., NEW BRUNSWICK
 WATERS, E. G., JERSEY CITY

*AYRES, D. R., NEW YORK
 BARRETT, R. L., NEW YORK
 BARROWS, D. N., NEW YORK
 BECK, A. C., BROOKLYN
 BISHOP, ELIOT, BROOKLYN
 BLAKELY, S. B., BINGHAMTON
 BONNER, ADOLPH, BROOKLYN
 BRANDT, M. L., NEW YORK
 BRETTAUER, JOSEPH, NEW YORK
 BRODER, N. E., NEW YORK
 BRODHEAD, G. L., NEW YORK
 BULLARD, E. A., NEW YORK
 CALDWELL, W. E., NEW YORK
 CHERRY, T. H., NEW YORK
 CLARK, C. E., SYRACUSE
 CLIFFORD, J. S., ROCHESTER
 COHEN, MOSES, LONG ISLAND CITY
 CORSCADEN, J. A., NEW YORK
 COWLES, H. C., NEW YORK
 DAICHMAN, ISIDORE, BROOKLYN
 DANNREUTH, W. T., NEW YORK
 DAVIN, E. J., NEW YORK
 DAVIS, G. H., BROOKLYN
 DENNEN, E. H., NEW YORK
 DERBRUCKE, M. G., BROOKLYN
 DICKINSON, R. L., NEW YORK
 DOYLE, F. B., BROOKLYN
 DUNCAN, CAMERON, BROOKLYN
 FALK, H. C., NEW YORK
 FARRAR, LILLIAN K. P., NEW YORK
 FEINER, DAVID, BROOKLYN
 FINLEY, J. R., NEW YORK
 FISCHER, H. S., BROOKLYN
 FIINT, AUSTIN, NEW YORK
 FRANK, R. T., NEW YORK
 FRED, F. C., NEW YORK
 FRIEDMAN, S. L., BROOKLYN
 FULKERTON, L. L., NEW YORK
 FURNISS, H. D., NEW YORK
 GAMBLE, T. O., ALBANY
 GEIST, S. H., NEW YORK
 *GIBSON, GORDON, BROOKLYN
 GLASS, MORRIS, BROOKLYN
 GODSICK, W. H., NEW YORK
 GOFF, B. H., NEW YORK
 GOLDBERGER, M. A., NEW YORK
 GOLDBLATT, M. E., NEW YORK
 GOLDSBOROUGH, F. C., BUFFALO
 GORDON, C. A., BROOKLYN
 GRAD, HERMANN, NEW YORK
 GREENBERG, SARAH K., BROOKLYN
 GREENE, H. J., BROOKLYN
 HAGSTROM, H. T., BROOKLYN
 HALE, WILLIAM, JR., UTICA
 HALL, S. C., BROOKLYN
 HALPERIN, JACOB, BROOKLYN
 HALSTED, HARBECK, NEW YORK
 *HARPER, P. T., ALBANY
 HARRAR, J. A., NEW YORK
 HAWTHORNE, JULIAN, RYE
 HEALY, W. P., NEW YORK
 HELLMAN, A. M., NEW YORK
 HENNESSY, J. P., NEW YORK
 HILDETH, WARREN, NEW YORK
 HIRSCH, AARON, BROOKLYN
 HOENIG, EDWARD, NEW YORK
 HOLDEN, F. C., NEW YORK
 HOLLADAY, E. W., NEW YORK
 HORNSTEIN, MARK, NEW YORK
 HOROWITZ, E. A., NEW YORK
 HUGHES, D. C., SYRACUSE
 HUMISTONE, O. P., BROOKLYN
 HURN, R. A., NEW YORK
 HYAMS, M. N., NEW YORK
 HYDE, C. R., BROOKLYN
 JACOBY, ADOLPH, NEW YORK
 JARCHO, JULIUS, NEW YORK
 JELLINGHAUS, C. F., NEW YORK
 JEWETT, W. A., BROOKLYN
 JUD, A. M., NEW YORK
 JUD, J. W., ITHACA
 KAHN, I. W., NEW YORK
 KAHN, M. H., BUFFALO
 KALICH, JOSEPH, BROOKLYN
 KAMINSKY, RICHARD, BROOKLYN

SUMMARY

1. A series of 223 patients operated upon by the Pomeroy method of sterilization is hereby reported.

2. This number of 223 patients constituted 1.30 per cent of all patients admitted to the Philadelphia Lying-In Hospital on both obstetric and gynecologic services from Oct. 1, 1924, to Dec. 31, 1933, a period of nine years and three months.

3. A definite follow-up was obtained in 71.7 per cent.

4. All patients in this series were sterilized by the same method.

5. Because of its simplicity and safety, and because there have been no known failures up to the present time, we feel that it is also a secure operation to do.

6. This operation can be done vaginally as well as abdominally.

7. Five deaths occurred in this series; all were either bad operative risks or death was caused by some of the accidents of postoperative convalescence.

Finally, this series is reported to stimulate similar evaluations of results in other clinics. In the light of our experience with this procedure, together with a review of the results of other methods, we believe that the simplicity and safety of the Pomeroy operation warrants its continued use.

1731 PINE STREET

Doan, R. C., and Simpson, W. M.: The Elliott Treatment of Pelvic Inflammatory Disease, *Am. J. Surg.* 28: 78, 1935.

In a series of 101 cases of pelvic inflammatory disease, good results were obtained in 67 per cent, fair results in 25 per cent and poor results in 8 per cent. Satisfactory improvement was noted in 92 per cent of the cases. In a group of 52 cases, including chronic salpingitis, acute exacerbation of chronic salpingitis, acute and subacute salpingitis, good results were obtained in 67 per cent, fair results in 23 per cent and poor results in 10 per cent. Satisfactory results were observed in 90 per cent of this group.

The highest proportion of good results was found in the acute and subacute forms of the disease with duration of less than three months. The erythrocyte sedimentation rate was found to be a reliable index of the resolution of the inflammatory process in approximately two-thirds of a group of 77 patients.

Gonococci disappeared from the cervical smears of all but 1 of 12 adult patients. Gonococcal vaginitis of children was found to be refractory to Elliott therapy in 3 of 4 cases.

The authors suggest that approximately 9 out of 10 patients with pelvic inflammatory disease may be treated successfully with Elliott therapy, without recourse to surgical intervention. In the few cases in which complications make surgery necessary, Elliott therapy before and after operation will greatly enhance the likelihood of prompt and favorable results.

J. THORNWELL WITHERSPOON.

REEVES, T. K., PITTSBURGH
 SCHEFFEY, L. C., PHILADELPHIA
 SCHUMANN, E. A., PHILADELPHIA
 STEVENSON, J. W., PITTSBURGH
 STURGIS, MARGARET C., PHILADELPHIA
 TAYLOR, J. S., ALTOONA
 TITUS, PAUL, PITTSBURGH
 TRACY, S. E., PHILADELPHIA
 TRUMPETER, J. H., BEAVER
 VAUX, N. W., PHILADELPHIA
 WILLIAMS, E. F., ALTOONA
 WILLIAMS, P. F., PHILADELPHIA

RHODE ISLAND

APPLETON, PAUL, PROVIDENCE
 HALE, F. S., PROVIDENCE
 MATTEO, F. I., PROVIDENCE

SOUTH CAROLINA

MCCRADY, R. L., CHARLESTON
 WILSON, L. A., CHARLESTON

TENNESSEE

BLACK, W. T., MEMPHIS
 BURCH, L. E., NASHVILLE
 LEWIS, M. S., NASHVILLE
 PRIDE, W. T., MEMPHIS
 REINBERGER, J. R., MEMPHIS
 RING, H. H., COOKEVILLE
 RUCH, W. A., MEMPHIS
 SCHREIBER, P. C., MEMPHIS
 *TOOMBS, P. W., MEMPHIS

TEXAS

BOURLAND, J. W., DALLAS
 COOKE, W. R., GALVESTON
 GROGAN, R. L., FORT WORTH
 HANNAIL, C. R., DALLAS
 MAXWELL, W. W., SAN ANTONIO
 PASSMORE, B. H., SAN ANTONIO

ROBINSON, H. R., GALVESTON
 SACHER, C. B., DALLAS

VERMONT

EASTMAN, O. N., BURLINGTON

VIRGINIA

ANDREWS, C. J., NORFOLK
 BAUGHMAN, GREER, RICHMOND
 GRAY, B. H., RICHMOND
 RUCKER, M. P., RICHMOND
 THORNHILL, P. E., NORFOLK
 WILLIAMS, T. J., UNIVERSITY

WASHINGTON

BELL, W. W., SEATTLE
 THOMPSON, G. G., SEATTLE

WEST VIRGINIA

BLOSS, J. R., HUNTINGTON

WISCONSIN

CAMPBELL, R. E., MADISON
 DARLING, F. E., JR., MILWAUKEE
 DAVIS, C. H., MILWAUKEE
 HARRIS, J. W., MADISON
 HORWITZ, J. J., MILWAUKEE

CANADA

CANNELL, D. E., TORONTO
 *CLELAND, F. A., TORONTO
 HARRIS, L. J., TORONTO
 HENDRY, W. B., TORONTO
 *LITTLE, H. M., MONTREAL
 SCOTT, W. A., TORONTO
 SHUTE, E. V., LONDON
 VAN WYCK, H. B., TORONTO

SYRIA

DORMAN, H. G., BEIRUT

 Erratum

On page 893, December, 1935 issue (discussion of Novak's paper), at the beginning of the last paragraph on the page, Carey Culbertson's name has been omitted, thus crediting the entire discussion to Robert T. Frank.

The discussion remarks beginning with "The first suggestion offered by Dr. Novak - - -" and ending on next page where Novak closes, should be credited to Culbertson.

- Moens et prostitution (Rogatz), 1061 (Book review)
- Morphine and paramorphine upon gravid uterus, effect of (Petzl), 721 (Abst.)
- and sodium amytal in labor (Dalehman and Shlr), 515
- Mortality in ectopic gestation, reduction of (Gordon), 286
- maternal, and maternal mortality rates (Young), 198
- neonatal (O'Connor), 872
- obstetric and fetal, influence of medical diseases on (Allen and Bauer), 885
- Mother and baby care in pictures (Zabrlskir), 1078 (Book review)
- Motor dysfunctions of kidney pelvis and ureter during pregnancy and puerperium (Sorrentino), 721 (Abst.)
- Mucocoele of vermiform appendix (Dannerreuther), 512
- Mucosa, tubal, decidual reactions in, in presence of Intrauterine pregnancy (Sjovall), 721 (Abst.)
- vaginal, glycogen content of, variations in, as relative index to quantitative amount of ovarian hormone available in organism (Krumm), 1035
- Myelitis complicating pregnancy and labor (Fraymann), 728 (Abst.)
- Myoma, uterine, heart in (Jacobs), 483
- Myomectomies during course of pregnancy and puerperium (Lantuejoul), 726 (Abst.)
- Myomectomy during gestation, question of (Rhemann), 727 (Abst.)
- Myxolipoma of vulva (Talamo), 884 (Abst.)

N

- National Committee on Maternal Health, report of a survey conducted by, 165
- Nembutal in treatment of preeclampsia and eclampsia (Ross), 120
- Neonatal mortality (O'Connor), 872
- Nephrostomy, unilateral, ligation of both ureters, recovery (Shitsky), 1015
- Nerve, presacral, resection of, for relief of pelvic pain (Hagaman), 995 (Abst.)
- New York Obstetrical Society, transactions of, 168, 898
- Newborn, surface bacteria of, a study of, and comparative values of cleansing agents (Patter and Abel), 1003

O

- Obstetric and fetal mortality, influence of medical diseases on (Allen and Bauer), 885
- and gynecologic tuberculosis (Jameson), 1058 (Book review)
- ebullies of mound builders of eastern Arkansas (Dellinger and Wakefield), 683
- methods at St. Mary Abbots Hospital, Kensington (Theobald), 172 (Abst.)
- pelvis (Thoms), 1062 (Book review)
- practice (Beck), 1061 (Book review)
- prognosis of large uterine fibroids (Mahon), 726 (Abst.)
- Obstetrical Society of Philadelphia, transactions of, 690, 898, 1056
- Obstetrics, 1061 (Book reviews)
- abortion, incomplete, treatment of (Drane), 1029
- American, a leader in, Charles Delucena Meigs (Thoms), 1049

Obstetrics—Cont'd

- and gynecology (Thoms), 1069 (Book review)
- in Virginia, brief history of (Rucker), 187
- Second Argentinian Congress of, 1061 (Book review)
- cerebral birth lesions, behavioral consequences of (Doll), 866
- cesarean section, abdominal, immediate and remote effect of (Montgomery), 908
- Latzko, report of 22, with modification in technic (Perrins), 525
- conception, month of, of 935 congenitally malformed individuals (Murphy), 106
- delivery, in breech presentation, single contraction (Rullson), 49
- spontaneous, complicated by rectal stricture, rectovaginal fistula and rupture of rectum (Kassebohm and Schrieber), 674
- eclampsia, vascular aspect of (Irving), 466
- ectopic gestation, mortality in, reduction of (Gordon), 286
- for general practitioner (Greenhill), 1062 (Book review)
- labor, blood loss in third stage of, and factors involved (Pastore), 78
- septate vagina complicating (Adams), 676
- sodium amytal and morphine in (Dalehman and Shlr), 515
- maternal mortality and maternal mortality rates (Young), 198
- mental attitudes in childbearing, influence of (Dershlmer), 414
- midwifery, 1068 (Book review)
- oculiposterior position (Cosgrove), 462
- out-patient, (Buxbaum), 409
- pelvic inclination (Garrett and Jacobs), 388
- postpartum infection (Krellenstein), 163
- preeclampsia and eclampsia, nembutal in treatment of (Ross), 120
- pregnancy, abdominal, secondary (Reel and Lewis), 957
- and gonorrhea, (Spiegler and Hartung), 728 (Abst.)
- anemia in, 687 (Editorial)
- notes on (Kersley and Mitchell), 725 (Abst.)
- arachnoidism in (Hilton), 159
- blindness in, incidental (de Carle), 929
- blood during, water concentration of, labor, puerperium and (Oberst and Plass), 61
- complicated by complete torsion of tube and ovary (Sheldon), 682
- ectopic, early ruptured, torsion of hydatid of Morgagni simulating (Tractenberg), 162
- endocrine interrelations during (Selye, Collip, and Thomson), 906 (Abst.)
- excretion of ovary stimulating hormone in urine during (Murphy), 908 (Abst.)
- extrauterine, endometrium in, occurrence and significance of decidual changes of (Siddall), 420
- following radical resection of rectum for carcinoma (Pommerehke), 522
- Friedman test for, observations on technic of (Young), 901 (Abst.)
- heartburn in (Rayner), 721 (Abst.)
- in sporadic cretinism (Patton), 670
- interstitial (Spencer), 680
- late, mild toxemias of (Herrick, Tillman, and Grebenc), 832
- peptic ulcer complicating (Mulsow and Brown), 1041

most part resenting the use of the vernacular, the physician treated his brethren, the surgeon and the apothecary, with haughtiness and the midwife with disdain.

The affairs of the colony were in the hands of the Virginia or London Company, as it was variously called. Among the subscribers of this company were Dr. Theodore Gulstone, censor of the College of Physicians, and ten other prominent physicians. These medical men were mindful of the health of the colony and were instrumental in sending qualified physicians, surgeons, and apothecaries with the first colonists. The frontier conditions broke down these artificial restrictions in the practice of medicine. Seldom do we find any reference to the old world notions of the rights and prerogatives of the different classes of practitioners. The physicians, ship surgeons, barber surgeons, apothecaries, and even apprentices did what was to be done according to their lights. The midwives alone seem to have their field to themselves, at least for nearly a century and a half.

Dr. Thomas Cullen began his address on "Early Medicine in Maryland" with the following quotation: "In June, 1608, John Smith sets out from Jamestown in an open barge of three tons' burden and with a crew of thirteen, hoping to find a passage westward into the Pacific. The party enters the Patapsco. Walter Russell, gentleman, doctor of physie, accompanies them and writes the history of this voyage." This might be taken as the text of my discourse. In the first place, Walter Russell was a gentleman. In the second place, he was a pioneer. A pioneer might be termed a practical man with an inquisitive mind, in contradistinction to an adventurer or an investigator. In the third place, he met emergencies as they arose. On this very voyage Captain Smith was dangerously wounded by a sting ray, and Russell, the physician, dressed the wound with what he had at hand. In the fourth place, he was forgotten, the fate of most doctors doing often remarkable pioneer work in obstetrics and gynecology in Virginia. Of the 197 Virginia doctors writing upon obstetrics and gynecology, only twenty-two are mentioned in Kelly's *Cyclopedia of American Medical Biography*. Sixteen of those had wartime reputations, fifteen in the Confederate Army and one in the Union.

One is tempted to trace the careers of Virginians who have made names for themselves outside of Virginia, men like Ephraim McDowell in Kentucky, Moses Montrose Pallen in St. Louis, Thaddeus Ashbury Reamy in Ohio, Richard Beverley Cole in California, Thomas Ashby and William Travis Howard in Baltimore, Henry Davidson Fry in Washington, Robert Mendenhall Huston, the brothers Mordecai and Joseph Price in Philadelphia, W. R. Pryor, George Tucker Harrison, LeRoy Brown, and Thomas A. Emmet in New York. This would carry me too far afield. Nor will I take up time with a discussion of the many priorities credited to Virginians. The first cesarean section in America in 1794; the first uterine sutures in a cesarean section in 1828; the first

- Obstetrics, pregnancy—Cont'd
 pseudoanemia of (Schultz), 725 (Abst.)
 renal function during, a comparison of different methods for measuring (Freyberg, Gillard, and Ganesbauer), 511
 surgical complications in (Priest), 578
 syndrome of, acute toxic hypertensive, relation of retinal changes to severity of (Mussey), 938
 toxemias of (Rowe, McManus, and Plummer), 856
 vaccination during, as a prophylaxis against puerperal infections (Bernstine and Otten), 37
 varicose veins in, injection treatment of (Nicholas), 476
 yeast meningitis in, fatal case of (Timernan), 686
 premature separation of placenta in private practice (DeNormandie), 325
 rupture of uterus (Sheldon), 455
 spontaneous (Schwartz and Kurzrok), 1038
 toxemias of late pregnancy (Herriek, Tiltman, and Grebene), 832; (Rowe, McManus, and Plummer), 856
 wheat germ oil (vitamin E) therapy in (Watson and Tew), 352
 Occipitoposterior positions (Cosgrove), 402
 Offspring, human, effects of radiation on (Miller, Corseaden, and Harrar), 518
 Operation, abdominal, massive blood transfusions during (Cashman and Baker), 240
 forceps, an analysis of 569 (Kane and Parker), 657
 gynecologic, 542 (Abst.)
 interposition of Schauta-Wertheim (Frei), 542 (Abst.)
 Kirschner-Wagner, for construction of artificial vagina (Barrows), 156
 Le Fort (Brocq and Du Peaux), 542 (Abst.)
 prolapse (Ahlthrop), 542 (Abst.)
 Operative treatment of urinary incontinence (Douglass), 268
 Os, external cervical, decidual reaction on (Róna), 723 (Abst.)
 Out-patient obstetrics (Buxbaum), 409
 Ovarian and uterine grafts (Cheval), 545, (Mayer), 546 (Absts.)
 experiments and clinical results of (Mayer), 168 (Abst.)
 follicular hormone, action of, in menopause, as indicated by vaginal smears (Papanicolaou and Shorr), 806
 function following hysterectomy (Siegmund), 515 (Abst.)
 grafts, cyst formation in (Hall), 516 (Abst.)
 hormone available in organism, variations in glycogen content of vaginal mucosa as a relative index to quantitative amount of (Krumm), 1035
 tumors, clinical and pathologic differentiation of certain special (Novak and Gray), 213
 endocrine effects of certain (Novak), 168 (Abst.)
 nature of virilizing (Bergstrand), 907 (Abst.)
 Ovaries, following preoperative administration of an extract of pregnancy urine (Hamblen and Ross), 14
 of pregnant women and pregnant rabbits, modifications of (Rosenblatt and Nathan), 981 (Abst.)
 transplantation of, experimental data on question of (Pavlenko), 515 (Abst.)
 Ovary, abscess of (Black), 487
 arrhenoblastoma of, multiple (Gnassi), 135
 Ovipositor lengthening reaction, hormonal studies with, of Japanese biterling (Kanter, Bauer, and Klawans), 764
 Ovulation and estrus in rat, effect of sympathetic denervation upon (Schwartz and Buxton), 132
 Ovum, normal human, in stage preceding primitive streak (Edwards, Jones, and Brewer), 672
- P
- Pain, sympathectomy for, associated with carcinoma of cervix, intraspinal alcohol injections and (Greenhill and Schmitz), 290
 Paramorphine and morphine, effect of, upon gravid uterine (Petit), 724 (Abst.)
 Parturition, massive collapse of lung complicating (Wilson), 667
 Patient and weather (Peterson), 1073 (Book review)
 Pelvis during diathermy, temperature determinations in female (Horowitz, Derow, and Bierman), 434 (Abst.)
 obstetric (Thoms), 1062 (Book review)
 oval or female type, is, rachitic manifestation (Thoms), 111
 Pelvic inclination (Garnett and Jacobs), 388
 inflammation, treatment of, by iontophoresis of acetyl-beta-methylcholine-chloride (Jacoby), 93
 Inflammatory disease, Elliott treatment of (Doan and Simpson), 105 (Abst.)
 joints in pregnancy, relaxation of (Abramson, Roberts, and Wilson), 721 (Abst.)
 measurements in white and colored female and their significance in childbirth (Pride), 495
 pain, resection of presacral nerve for relief of (Hagaman), 995 (Abst.)
 surgery (Roeha), 1059 (Book review)
 Peptic ulcer complicating pregnancy (Mulsow and Brown), 1011
 Pericardial effusion, premature separation of placenta and circulatory collapse associated with (Harvey), 803
 Peripheral neuritis and abortion following dimethylphenol therapy (Epstein and Rosenblum), 521 (Abst.)
 Peritonitis, generalized, from rupture of pyosalpinx (Solman), 774 (Abst.)
 Phosphatemia in normal and pathologic pregnancy, in labor and in puerperium (Guercio), 723 (Abst.)
 Physiologie und Pathologie der Wehen (Antoine), 1065 (Book review)
 Physiology and pathology of pregnancy, 719 (Abst.)
 Pituitary, anterior, estrogenic, and carcinogenic growth principles, and their clinical relation to benign and malignant tumors (Witherspoon), 173 (Collective review)
 growth factor and cancer (Witherspoon), 176 (Collective review)
 gland, irradiation of, in treatment of menopausal symptoms (Collins, Thomas, and Menaville), 115
 gonadal interrelations, anterior, concerning (Nelson), 694 (Abst.)
 shock (McMann), 1047

next year the House of Burgesses voted the sum of 100 pounds sterling to said Constant Woodson, provided she produce a certificate as to the efficiency of her cure from under the hands of Theodrick Bland, James Feild, William Black, and Robert Brown or any two of them. There is no record in the Treasurer's office of such a sum being paid, so it is likely that Constant failed to convince the doctors. The only book on obstetrics except James Black's copy of Sharpe's *Midwifery in Virginia* in this period was *Of the Birth of ManKinde*, the English translation of Rösslin's celebrated book for midwives.

There is no way of knowing with any degree of accuracy the maternal or fetal mortality. Both must have been high. Large families were the rule. Mention of the twentieth child is not uncommon in the diaries of the time, which shows that some women at least survived a number of pregnancies. On the other hand many women died young. William Allason's *Letter Books* record that of Mrs. Allason's almost annual pregnancies, only one child, the first, survived the first month, and she herself died early. M. C. Harris has collected for me the records of 44 families before 1750. The data were gathered from family Bibles, tombstones, etc. There were 66 wives, of whom four died shortly after childbirth. Of the 291 children born to these families, five died in infancy. No mention is made of stillbirths. Each wife averaged 4.41 children. An analysis of the section of Burgesses and other prominent persons of Tyler's *Cyclopedia of Biography* gives somewhat similar results, considering the fact that usually only the children who grew up are mentioned. The average number of wives per man was 1.18, and the average number of children per wife was 2.57. (In 689 cases the number of wives are mentioned and their total was 814, and in 459 instances the number of children are recorded, their total being 1,177.)

The first part of the second period is likewise to a large extent shrouded in mystery. The first American cesarean section belongs here. It was performed in 1794 by Jesse Bennett upon his own wife and escaped the profound search of so great a student of cesarean operation as Robert P. Harris. Joseph L. Miller gives a well-documented account of this operation. Bennett later moved to Mason County on the Ohio River, and as the operation was common knowledge there, Miller suggests that it may have influenced Richmond of Newtown, Ohio, who is generally credited with the first cesarean section. Hugh Trout further suggests that it may have influenced Ephraim McDowell. Humphreys of Staunton was a consultant in Mrs. Bennett's case and refused to operate. Humphreys was also the preceptor of Ephraim McDowell, and shortly after the operation was performed, McDowell must have visited Humphreys on his way home from Edinburgh. It is only natural that they should have discussed such an unique operation. A more tangible evidence of the influence that these early American operations had is furnished by Singer himself. Harris, writing in 1878, recognized and

- Placenta, fibrosis of (Montgomery), 253
 premature separation of, and circulatory collapse associated with pericardial effusion (Harvey), 803
 In private practice (DeNormandie), 325
 vascular changes in, probable rôle of hypercholesterolemia of pregnancy in producing, predisposing to placental infarction and eclampsia (Bartholomew and Kracke), 549
- Placentas, normal and pathologic, syncytial degeneration in (Tenney), 1021
- Pneumococcus pelvic infection in women (Templins), 70
- Polynuritis, pregnancy (Sze), 727 (Abst.)
- Position, occipitoposterior (Cosgrove), 402
 Trendelenburg, value of, for occult prolapse of cord (Bourland), 1063
 uterine support and, mechanics of (Menger), 775; (Harris, Menger, and Plass), 1009
- Preeclampsia and eclampsia, nembatal in treatment of (Ross), 120
- Pregnancy, abdominal, secondary (Itel and Lewis), 957
 and gonorrhea (Spiegler and Hartung), 728 (Abst.)
 and labor, myelitis complicating (Fraymann), 728 (Abst.)
 and menstrual cycle, preliminary observations on (Dowell), 721 (Abst.)
 and puerperium, heribet complicating (Fujita), 727 (Abst.)
 myomectomies during course of (Lantuejoul), 726 (Abst.)
 anemia in, 687 (Editorial)
 note on (Kersley and Mitchell), 725 (Abst.)
 arachnoidism in (Hilton), 159
 biologie diagnosis of, and menopause (Wodon), 902 (Abst.)
 blindness in, incidental (de Carle), 929
 blood during, water concentration of, labor and puerperium (Oberst and Plass), 61
 calcium-potassium constant of organs during (Orru), 722 (Abst.)
 complicated by complete torsion of tube and ovary (Sheldon), 682
 eclampsia, vascular aspect of (Irving), 466
 ectopic, early ruptured, torsion of hydatid of Morgagni stimulating (Tractenberg), 162
 ruptured, hemoglobinuria as a symptom of (Pommerenke), 659
 endocrine interrelations during (Selye, Collip, and Thomson), 906 (Abst.)
 excretion of ovary stimulating hormone in urine during (Murphy), 908 (Abst.)
 extrauterine, endometrium in, occurrence and significance of decidual changes of (Siddall), 420
 following radical resection of rectum for carcinoma (Pommerenke), 522
 Friedman test for, observations on technique of (Young), 901 (Abst.)
 heartburn in (Rayner), 721 (Abst.)
 hypercholesterolemia of, probable rôle of, in producing vascular changes in placenta, predisposing to placental infarction and eclampsia (Bartholomew and Kracke), 549
 in sporadic cretinism (Patton), 670
 interstitial (Spencer), 680
 intrauterine, decidual reactions in tubal mucosa in presence of (Sjovall), 724 (Abst.)
- Pregnancy—Cont'd
 labor, umbilical sac in, rôle of (Spade-man), 615
 blood loss in third stage of, and factors involved (Pastore), 78
 sodium amylal and morphine in (Dalehman and Shlr), 515
 late, mild toxemias of (Herriek, Tillman, and Grebenc), 832
 magnesium in normal and pathologic (Guercio), 723 (Abst.)
 peptic ulcer complicating (Mulsow and Brown), 1011
 phosphatemia in normal and pathologic, in labor, and in puerperium (Guercio), 723 (Abst.)
 physiology and pathology of, 719 (Abst.)
 polyneuritis (Sze), 727 (Abst.)
 preeclampsia and eclampsia, nembatal in treatment of (Ross), 120
 pseudo-anemia of (Schultz), 725 (Abst.)
 puerperal infection, statistical studies on (Peckham), 435, 582, 996
 relaxation of pelvic joints in (Abramson, Roberts, and Wilson), 721 (Abst.)
 renal function during, comparison of different methods for measuring (Freyberg, Gillard, and Ganesbauer), 511
 surgical complications in (Priest), 578
 syndrome, acute toxic hypertensive, relation of retinal changes to severity of (Mussey), 938
 test for urine, a new rapid (Reiprich), 720 (Abst.)
 toxemias of (Rowe, McMunus, and Plummer), 556
 urine, preoperative administration of an extract of, study of ovaries following (Hamblen and Ross), 14
 vaccination during, as prophylaxis against puerperal infections (Bernstine and Otten), 37
 varicose veins in, injection treatment of (Nichols), 476
 yeast meningitis in, fatal case of (Timmerman), 686
- Premature infant (Ehrenfest), 169 (Editorial)
 separation of placenta and circulatory collapse associated with pericardial effusion (Harvey), 803
 In private practice (DeNormandie), 325
- Presacral nerve, resection of, for relief of pelvic pain (Hagaman), 995 (Abst.)
- Presentation, breech, single contraction delivery in (Rullison), 49
- Preventive medicine and hygiene (Rose-nau), 1073 (Book review)
- Principles and practice of medicine (Osler and McCrae), 1073 (Book review)
- Progesterin and human corpus luteum (Pratt), 901 (Abst.)
- Prolan A and B in urine of women castrated by x-ray treatment or by operation (Lassen and Brandstrup), 901 (Abst.)
 in emesis and hyperemesis gravidarum, investigation (Anker and Lund), 906 (Abst.)
- Prolapse of cord, value of Trendelenburg position for occult (Bourland), 1063
 operations (Ahltorp), 512 (Abst.)
- Prolapsed cord, a protective shield for (Menger), 153
- Prostitution, morals and (Rogeat), 1061 (Book review)
- Pruritus, anogenital, treated surgically (Cotte and Gaté), 1034 (Abst.)
- Pseudo-anemia of pregnancy (Schultz), 725 (Abst.)
- Puberty, period of, and inception of menstruation (Fluhmann), 573

The usual way of controlling serious postpartum hemorrhage was to massage the uterus with one hand within the uterus and with the other hand on the abdomen. In some sections of the State it is still the practice to pack the vagina with a roller bandage soaked in turpentine. In the *Virginia Medical Monthly* there is an account of Hyatt's (Kinston, N. C.) method of controlling postpartum hemorrhage with a rubber bag filled with cold water, and in a subsequent issue, a correspondent writes that Diday used the same method in 1850. "In hemorrhage from abortion, astringents are of no avail." The uterine cavity must be cleaned out with the finger or else tamponed. Harvey Black described the character of pulse that is premonitory to postpartum hemorrhage (frequent and fretful).

In 1791 and 1799 William Baynham operated successfully for extra-uterine pregnancy. The first patient consulted him three or four years after a missed labor. She was then in excellent health. He made the diagnosis of an extrauterine conception and advised the patient that she would have to wait the return of a second labor; "that at some future day nature become weary of her burthen, would in some way or other manifest a disposition to rid herself of it." Three and a half years later she was seized with influenza which was then epidemic. The abdominal tumor became painful and continued to be a little troublesome to her until April, 1790. The tumor was then pointing toward the left side, where the integuments were inflamed. He attempted to open the tumor but after making an incision two or three inches he desisted, having neither books to consult nor medical friends to advise with. By January, 1791, it was evident that something must be done to save the woman's life. He determined at all hazards to extract the child. This time he continued the incision deeper and was successful in extracting the fetus in parts. It lay in a separate sac that apparently did not communicate with the peritoneal cavity and was lined with a thin incrustation of osseous matter. The second case was similar but of only eighteen months' duration. This time he did not delay the operation but made an incision over the most prominent part of the tumor, thereby exposing the head of the child. Guided by his finger within the cavity he extended the incision cautiously up and down until it was large enough for him to remove the child. It was of the common size and sound, except on the head where a small part of the scalp was in an incipient state of putrefaction. There was no fluid in the cavity. He did not attempt to remove the placenta. Some pieces were thrown off at almost every dressing, but it was upwards of a fortnight before the string came away. Baynham thought that such cases were not uncommon and went unrecognized. Tragic ruptured ectopies were certainly unrecognized or else did not occur. I cannot find the report of a single case. There was quite an interesting lot of reports of abdominal pregnancies. John A. Cunningham reported the case of an old negro cook who carried a fetus forty years. It was finally discharged through the rectum. H. G.

- Puerperal fever, actual therapy of (Serdukoff), 181 (Abst.)
 chills in prognosis of, significance (Batisweiler), 180 (Abst.)
 etiology of (Horn), 178 (Abst.)
 gynecology (Bubis), 1067 (Book review)
 infection (Martland), 178 (Abst.)
 due to anaerobic streptococci, (Schwarz and Brown), 379
 Elliott treatment in (Moore), 147
 etiology of (Paine), 178 (Abst.)
 statistical studies on (Peckham), 435, 582, 996
 vaccination during pregnancy as prophylaxis against (Bernstine and Otten), 37
 sepsis and pyemia observed during twelve years at Frankfurt Women's Clinic (Stähler), 179 (Abst.)
 and secondary anemia, blood transfusion in cases of (Kochmann), 181 (Abst.)
 metastases (Menzel), 180 (Abst.)
 Puerperium and pregnancy, myomectomies during course of (Lantuejoul), 726 (Abst.)
 blood during, water concentration of, pregnancy, labor and (Oberst and Plass), 61
 hemorrhage during, cutaneous, with later development of acute yellow atrophy (Stone and Bunim), 1015
 hemorrhages in (Goetze), 180 (Abst.)
 pathologic, 178 (Abst.)
 Pulmonary tuberculosis, collapse therapy in treatment of, influence of, on menstrual physiology (Jameson), 30
 Pyosalpinx, rupture of, generalized peritonitis from (Saimaru), 774 (Abst.)
 Pyemia and puerperal sepsis (Stähler), 179 (Abst.)

Q

- Quartz lamp, treatment of condylomata with (Chmielewsky), 36 (Abst.)
 Quinine, antenatal use of (Buddee), 722 (Abst.)

R

- Rachitic manifestation, is oval or female type pelvis (Thoms), 111
 Radiation, effects of, on human offspring (Miller, Corcoran, and Harter), 518
 interstitial, of cervix, with suggested modification of Tausig's operation (Duncan), 623
 Radium and x-ray, effects of, on cancer of cervix (Auer), 790
 Rectal stricture, spontaneous delivery complicated by (Kasseholm and Schreiber), 674
 Rectovaginal fistula, spontaneous delivery complicated by (Kasseholm and Schreiber), 674
 Rectum, resection of, for carcinoma, pregnancy following radical (Pommerenke), 522
 rupture of (Kasseholm and Schreiber), 674
 Renal function and blood chemistry in abruptio placentae (Dieckmann), 734
 during pregnancy, comparison of different methods for measuring (Freyer, Gillard, and Gaudinot), 511

- Resection of presacral nerve for relief of pelvic pain (Hagaman), 995 (Abst.)
 of rectum for carcinoma, pregnancy following radical (Pommerenke), 522
 Retinal changes, relation of, to severity of acute toxic hypertensive syndrome of pregnancy (Mussey), 938
 Review of new books, 1057
 Roentgenotherapy of chorionepithelioma (Davis and Brunschwig), 987
 Rupture of rectum, spontaneous delivery complicated by (Kasseholm and Schreiber), 674
 of uterus, record of 26 cases (Sheldon), 455
 spontaneous (Schwartz and Kurzrok), 1038

S

- Sedimentation test, with what certainty does, determine inflammatory disease of genitalia (Guthmann and Neuhaus), 529 (Abst.)
 Segundo Congreso Argentino de Obstetricia y Ginecologia (Guiray), 1064 (Book review)
 Senile vaginitis with estrogenic hormones, treatment of (Jacoby and Rabbiner), 654
 Separation, premature, of placenta and circulatory collapse associated with pericardial effusion (Harvey), 803
 Sepsis, puerperal, and pyemia (Stähler), 179 (Abst.)
 and secondary anemia, blood transfusion in cases of (Kochmann), 181 (Abst.)
 metastases in (Menzel), 180 (Abst.)
 Septate vagina complicating labor (Adamson), 676
 Septic cases, strict isolation of (Clason), 179 (Abst.)
 Septum of uterus septus, technique of successful removal of, and subsequent deliveries at term (Lankart), 797
 Serum, dried blood, of women, varying patterns of (Smith), 618
 Sex hormones, some pitfalls in study of (Swezy), 900 (Abst.)
 Sexologist, world journey of, men and women (Hirschfeld), 1071 (Book review)
 Shield, protective, for prolapsed cord, (Mengert), 153
 Shock, pituitary (McMann), 1017
 Smears, vaginal, action of ovarian follicular hormone in menopause, as indicated by (Papantochou and Shorr), 806
 Smoking, cigaret, effect of excessive, on maternal health (Campbell), 502
 Society transactions, American Association of Obstetricians, Gynecologists and Abdominal Surgeons, 367
 Brooklyn Gynecological Society, 690
 Chicago Gynecological Society, 690, 898
 New York Obstetrical Society, 168, 898
 Obstetrical Society of Philadelphia, 690, 898, 1056
 Washington Gynecological Society, 511, 690
 Sodium amylal and morphine in labor (Dachman and Shif), 515
 Spermatozoa, duration of life of, in human fallopian tube (Giffin), 681 (Abst.)
 Squamous cell carcinoma, primary, in body of uterus (Goldman), 372
 Sterility (De Groen, Re) (Abst.)

cervix was treated either medically or surgically. Cupping over the lower spine was at one time the favored remedy. Later this was supplanted by chloral hydrate. For a while gelsemium had many users. In 1851 Reynale reported a case in which neither he nor his consultants could find any opening in the cervix. He made an incision two inches long in the cervix and labor continued to a successful conclusion. The outstanding work in this field was done by William A. Patteson. In 1854 he performed what we now call Dührssen's incisions, which he called "vaginal hysterotomy." Later he reported two other cases. William J. Harrison reported a case that was bled twice and in which nauseants were fully tried. He finally resorted to Dr. Patteson's operation. William K. Gatewood also reported a case of this operation.

The perineum did not cause great concern. Certainly very little was written about it. Hunter McGuire discussed supporting the perineum during labor. He considered it useless and fraught with danger. In 1852 R. M. Taliaferro reported a case of rigidity of the soft parts in which delivery was effected after he had made a mediolateral incision in the perineum. The word episiotomy was first used five years later. Taliaferro laid no claim to originality but said that a similar case had been reported "in the last July number of the *London Lancet*."

Oxytocics were popular, judging from the number of articles published. Four were upon the preparation of ergot. It is interesting to note, in view of the recent work on ergot, that the majority of the preparations contained the watery extract. Nevertheless the clinical reports were not always laudatory. Parker said that it failed to work in 8 out of 10 cases, although Wellford and others disagreed with him. The use of ergot was widespread. It was given by mouth usually, but when the patient was nauseated, the powder was dusted on a blistered surface. In a series of 17 primiparous labors reported by McSherry, ergot was used in 4. In each there was a stillbirth. He lost 10 babies, not counting a hydrocephalic, in the 17 deliveries.

Robert T. Coleman found quinine to be a weaker oxytocic than ergot, and therefore it was to be preferred in the first stage of labor. Dr. Skelton was of the same opinion. Dr. Grammer of Halifax preferred the tincture of mistletoe to ergot.

- Sterilization, contraception, and hygiene of marriage in medical curriculum, 165
 surgical, a résumé of 223 cases of (Lull), 101
 Streptococci, anaerobic, puerperal infection due to (Schwarz and Brown), 379
 Stricture, rectal, spontaneous delivery complicated by (Kassebaum and Schreiber), 671
 Superfetation, is, possible in human being (Studdiford), 815
 Supernumerary breasts, adenocarcinoma of, of labia majora in case of epidermoid carcinoma of vulva (Greene), 369
 Surgery, aids to (Doll and Liddle), 1677 (Book review)
 pelvyle (Roehn), 1059 (Book review)
 Surgical complications in pregnancy (Priest), 878
 sterilization, a résumé of 223 cases of (Lull), 101
 treatment of tuberculous of female genitalia (Daniel), 511 (Abst.)
 Sympathectomy for pain associated with carcinoma of cervix, intraspinal alcohol injections and (Greenhill and Schmitz), 290
 Sympathetic denervation, effect of, upon ovulation and estrus in rat (Schwartz and Buxton), 132
 Syncytial degeneration in normal and pathologic placentas (Tenney), 1021
 Syndrome of pregnancy, acute toxic hypertensive, relation of retinal changes to severity of (Mussey), 938
 Syphilis and marriage (Greenbaum, Katz, and Rule), 143 (Abst.)
 clinical management of (Harnes), 1972 (Book review)
 during pregnancy, demonstrations of, value of flocculation reactions for (Kolbe and Szekacs), 728 (Abst.)
 transmission of, by blood transfusion (Jones, Rathmell and Wagner), 715 (Abst.)

T

- Taussig's operation, suggested modification of, interstitial radiation of cervix (Duncan), 623
 Thrombophlebitis and emboli following gynecologic operations (Marchese), 514 (Abst.)
 Torsion of hydrotid of Morgagni simulating early ruptured ectopic pregnancy (Trautenberg), 162
 of tube and ovary complicating pregnancy, complete (Sheldon), 182
 Toxemias of pregnancy (Herrick, Thimman, and Grebene), 832; (Rowe, McMannus, and Plummer), 856
 Trabajos Científicos 1931-1931, 1066 (Book review)
 Traitement de L'Eclampsie (Stroganoff), 1063 (Book review)
 Transfusions, blood (Pantoro), 443 (Abst.)
 during abdominal operations, massive (Cashman and Baker), 240
 in puerperal sepsis and secondary anemia (Kochmann), 181 (Abst.)
 transmission of syphilis by (Jones, Rathmell, and Wagner), 715 (Abst.)
 Transplantation of ovaries (Pavlenko), 545 (Abst.)
 Trendelenburg position, value of, for occult prolapse of cord (Bourland), 1043
 Trichomonas vaginalis vaginitis (Angelucci), 1020
 Tubal mucosa, decidual reactions in, in presence of intrauterine pregnancy (Sjovall), 724 (Abst.)
 Tube and ovary, complete torsion of, complicating pregnancy (Sheldon), 182
 Tubercle bacilli in blood of umbilical cord and in newborn infants of tuberculous mothers (Siegel and Singer), 725 (Abst.)
 Tuberculosis, gynecologic and obstetric (Jameson), 1058 (Book review)
 of female genitalia, surgical treatment of (Daniel), 511 (Abst.)
 primary, of vagina (McGobrick), 681
 pulmonary, collapse therapy in treatment of, influence of, on menstrual physiology (Jameson), 39
 Tuberculous mothers, tubercle bacilli in blood of umbilical cord and in infants of (Siegel and Singer), 725 (Abst.)
 Tumors, adnexal, operative treatment of (Wolf), 515 (Abst.)
 benign and malignant, estrogenic, carcinogenic, and anterior pituitary growth principles (Witherspoon), 173 (Collective review)
 Brenner (Novak and Gray), 225; (Freund), 516 (Abst.)
 double malignant, of uterus (Comsaller and Butsch), 628
 granulosa cell, hormonal functions of (Dworzack and Poleschka), 907 (Abst.)
 of breast, benign and malignant (Witherspoon), 173 (Collective review)
 ovarian, clinical and pathologic differentiation of certain special (Novak and Gray), 213
 endocrine effects of certain (Novak), 908 (Abst.)
 nature of virilizing (Bergstrand), 907 (Abst.)
 vulvar, contribution to study of (Doherty), 351 (Abst.)

U

- Uter, peptic, complicating pregnancy (Mulsow and Brown), 1011
 Ureter and kidney pelvis, motor dysfunctions of, during pregnancy and puerperium (Sorrentino), 721 (Abst.)
 ligation of both, unilateral nephrostomy, recovery (Slutsky), 1015
 Urinary bladder, primary endometriosis of (Hendriksen), 831 (Abst.)
 incontinence, operative treatment of (Douglass), 268
 infections, mandelic acid in treatment of (Rosenheim), 29 (Abst.)
 Urine, hormones in, quantitative examinations of (Damm), 903 (Abst.)
 in chorionepithelioma, observations on concentration of anterior pituitary-like hormone in (Linett), 128
 luteinizing hormone in, presence of large amount of, in case of intra-uterine cyst (Brindeau, Hinglais, and Hinglais), 908 (Abst.)
 pregnancy, preoperative administration of an extract of, a study of ovaries following (Hamblen and Ross), 14
 test for, new rapid (Reiprich), 720 (Abst.)
 prolactin A and B in, of women castrated by x-ray treatment or by operation (Lassen and Brandstrup), 904 (Abst.)
 Uterine and ovarian grafts (Cheval), 515, (Mayer), 516 (Absts.)
 experiments and clinical results of (Mayer), 108 (Abst.)

Ross reported the case of a woman with three breasts. The extra breast functioned during the puerperium, but the nipple was not large enough for the baby to nurse.

In 1866 James Bolton amputated a breast for cancer and was surprised that the wound healed by first intention. A case of removal of an inoperable cancer with caustic was reported by Alexander Harris. Alexander Weddell reported a similar case in which he used chloride of zinc paste. When it recurred two years later the patient evidently considered the treatment worse than the disease, for he could not prevail upon her to undertake it again.

The third category was productive of many queer case reports. Ayler had a case of inveterate mammary neuralgia due to unsuspected uterine version. Harrison cured a case of interrupted menstruation that had been treated unsuccessfully by three doctors, by the application of mustard plasters to the breasts. Dr. Coleman used the same treatment for a case of vicarious diarrhea. The menstruation reappeared and the diarrhea stopped after three days of treatment.

Imperforate vaginae described by Virginia doctors were either congenital, acquired, or deliberately produced. Craghead cured an imperforate hymen with retention of menses by a crucial incision. The case reported by Mettauer required an incision $1\frac{3}{4}$ inches deep and the introduction of a large bougie formed of wax moulded over a tube, for six months. Riddell reported a case of complete atresia of the vaginal canal and the absence of the uterus.

Cases of atresia following labor were reported by Michie (from Gibson's clinic), Alban S. Payne, and Robert Nelson. In Pendleton's case the atresia occurred in a parturient female.

Dorsey Cullen cured a case of procidentia by elytrorrhaphy. Stone cured a case of complete vaginal prolapse with senile atrophy of the uterus by occluding the vagina completely. Cox produced the same effect with caustic.

Malpositions of the uterus were the source of almost constant discussion. Goodridge A. Wilson complained that hundreds of females were annually sent from the South to the northern cities for the express purpose of being supplied with pessaries made to order. Little condemns the pessary. Bolton and Conway used it with satisfaction. Cunningham, Snead, and Deane condemned its use. G. T. Searburgh invented a pessary with a flexible stem, and Cunningham exhibited a different type of pessary of his own designing. Charles A. Budd advocated curative treatment of prolapsus uteri by the local application of tannin.

The relationship of retroversion to hyperemesis is shown in a case reported by John M. Upshur. Herbert Claiborne reported a case of retroversio uteri. His patient was two and one-half months pregnant. Upshur also reported a case of prolapse of the uterus during labor. James Dunn did an Emmet's operation for procidentia uteri. Other

Uterine—Cont'd

- bleeding (Rongy, Tamls, and Gordon), 300
 - of functional origin, excessive (Wilson and Kurzrok), 911
 - fibroids (Witherspoon), 174 (Collective review)
 - obstetric prognosis of large (Mahon), 726 (Abst.)
 - myoma, heart in (Jacobs), 483
 - perforation occurring during curettement (Bernardberg), 544 (Abst.)
 - support and position, mechanics of (Mengert), 775; (Harris, Mengert, and Plass), 1009
- Uterus, body of, primary squamous cell carcinoma in (Gellhorn), 372
- double malignant tumors of (Counsellor and Butsch), 628
 - gravid, effect of morphine and paramorphine upon (Pettl), 724 (Abst.)
 - intramural cysts of, large (Hamblen), 530
 - rupture of, record of 26 cases of (Sheldon), 455
 - spontaneous (Schwartz and Kurzrok), 1038
 - septus, septum of, technique of successful removal of, and subsequent deliveries at term (Lulkaert), 797

V

- Vaccination during pregnancy as prophylaxis against puerperal infections (Bernstine and Otten), 37
- Vagina, construction of artificial, Kirschner-Wagner operation for (Barrows), 156
- primary tuberculosis of (McGoldrick), 684
- Vaginal hernia of Douglas' culdesac (Stearns), 144
- mucosa, glycogen content of, variations in, as relative index to quantitative amount of ovarian hormone available in organism (Krumm), 1035
 - smears, action of ovarian follicular hormone in menopause, as indicated by (Papanicolaou and Shorr), 806
- Vaginitis, senile, treatment of, with estrogenic hormones (Jacoby and Rabblner), 651
- trichomonas vaginalis (Angelucci), 1020
- Varicose veins in pregnancy, injection treatment of (Nicholas), 476
- Vascular aspect of eclampsia (Irving), 466

- Venereal disease information, 1074 (Book review)
- Vermiform appendix, mucocele of (Dannreuther), 342
- Vesleovaginal fistula (Phaneuf), 316
- Vitamin A content of human colostrum (Repettl), 131 (Abst.)
- B, experimental study of effects of, on female genital organs (Ueno), 727 (Abst.)
 - E (wheat germ oil therapy) in obstetrics (Watson and Tew), 352
- Importance of, to female (Guggisberg), 1071 (Book review)
- Vulva, cancer of, late results in treatment of leucoplakie vulvitis and (Taussig), 746
- dermatitis of, chronic atrophic (Adair and Davis), 1037 (Abst.)
 - epidermoid carcinoma of, adenocarcinoma of supernumerary breasts of labia majora in case of (Greene), 660
 - myxolipoma (Talamo), 884 (Abst.)
- Vulvar tumors, a contribution to study of (Dogliotti), 351 (Abst.)
- Vulvitis, leucoplakie, and cancer of vulva, late results in treatment of (Taussig), 746

W

- Washington Gynecological Society, transactions of, 541, 690
- Water concentration of blood during pregnancy, labor and puerperium (Oberst and Plass), 61
- Weather, patient and (Peterson), 1073 (Book review)
- Wheat germ oil (vitamin E) therapy in obstetrics (Watson and Tew), 352
- Williams, John Whitridge (Slemons), 1070 (Book review)
- Woman asks the doctor (Novak), 1060 (Book review)
- Women and men, the world journey of sexologist (Hirschfeld), 1071 (Book review)
- diseases of (Crossen and Crossen), 1058 (Book review)

X

- X-ray and radium, effects of, on cancer of cervix (Auer), 790

Y

- Yeast meningitis in pregnancy, fatal case of (Timmerman), 686

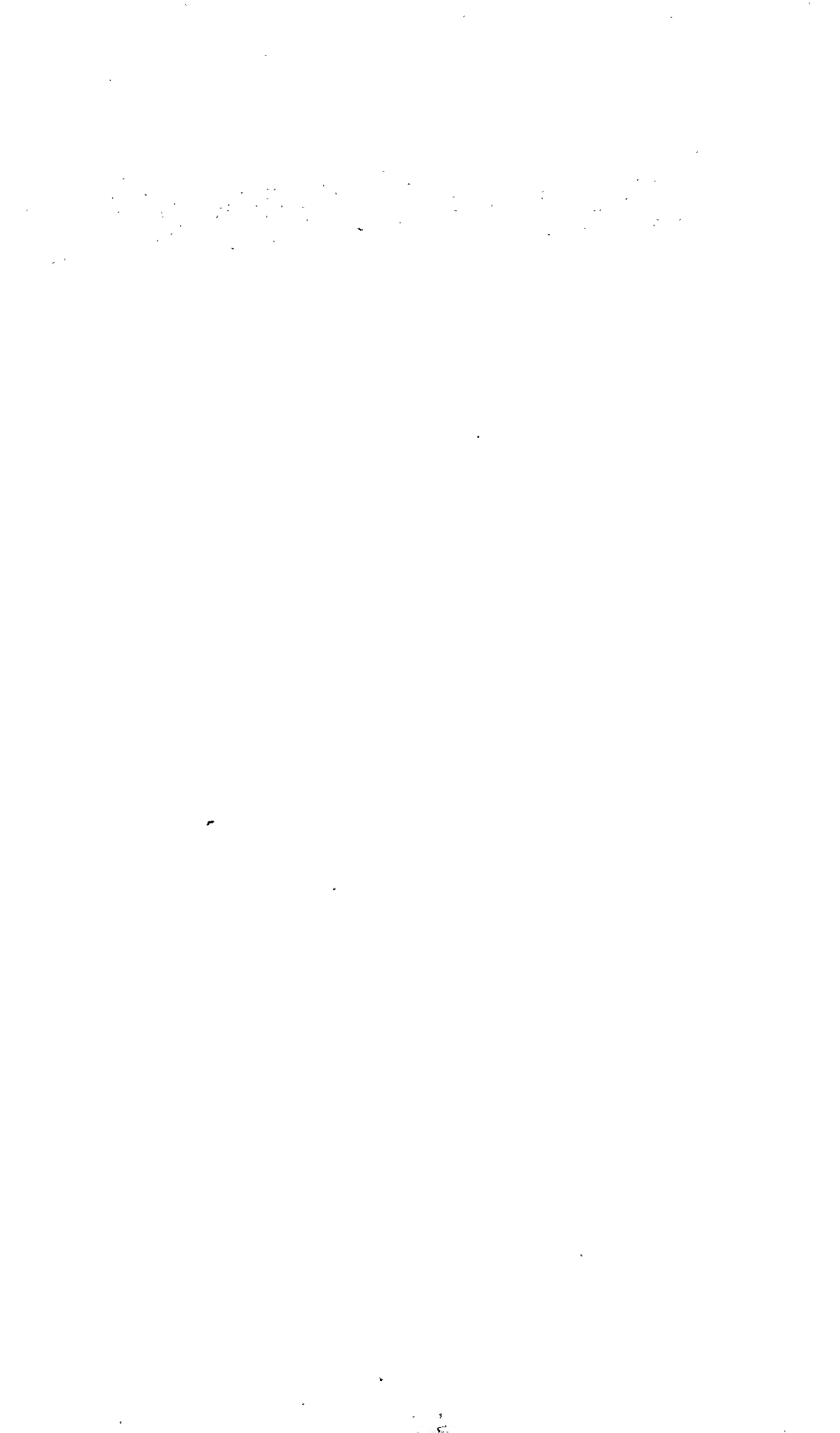
MATERNAL MORTALITY AND MATERNAL MORTALITY RATES*

JAMES YOUNG, D.S.O., M.D., F.R.C.S., F.C.O.G., LONDON, ENGLAND

IN 1931, during the session of the British Departmental Committee on Maternal Mortality and Morbidity, a commission visited Holland, Denmark, and Sweden on behalf of the Ministry of Health to study the conditions governing the maternity services of these countries whose official maternal death rates were greatly superior to our own. The results of this visit are recorded in the Final Report of the Committee.¹ For our present purpose it is sufficient to recall that, while the Dutch figures revealed for that country an obstetric experience superior to that of Great Britain, the methods governing the assignment of the maternal deaths in Denmark and Sweden to puerperal and nonpuerperal categories differed so greatly from our own that it was impossible to establish a comparison on the basis of the official rates of the respective countries. For example, in Denmark eclampsia did not appear under the puerperal heading at all but was embraced with convulsions at all ages and in both sexes under circumstances which effectively concealed its relation to childbearing, while an analysis of the deaths occurring in Gothenburg revealed that the official method of allocation in Sweden reduced the puerperal death rate by about 50 per cent as compared with the system obtaining in England and Wales.

One of the most striking features of the procedure regulating the assignment of the deaths observed in these two countries was the manner in which this function had tended to become stereotyped in the hands of officials and to have passed completely out of the control of the clinicians. We were brought face to face with the somewhat strange phenomenon that deaths, which the obstetricians in their hospital reports had assigned to the appropriate puerperal heading according to the principles governing such hospital records in most countries, were placed by the public official in a category which divested them of their puerperal bearing. Further, both in Denmark and Sweden even the leading obstetricians were in ignorance of the methods which for many years had so regulated the compilation of the national statistics of their respective countries.

We do not intend to infer that the general methods of assignment in these Scandinavian countries were inferior to those of Great Britain. The facts may, however, be held to demonstrate that, where these are based upon systems which tend to disregard the only foundation upon which a scheme of uniformity can be built, namely, that which insists



more and more evident that this question must demand the serious attention of obstetricians so far as the varying experiences of different countries in regard to the care of their pregnant and parturient women offer unlimited opportunities for profitable study to those engaged in the problems of maternity. Under existing conditions such a study is stultified by the fact that the assessment of even the gross clinical data upon which the assignment of maternal mortality is based varies within such large limits. It would seem to be obvious that before uniformity on this plane can be achieved a common international understanding on the part of obstetricians is essential.

Another main factor making for a lack of comparability is to be found in the manner in which abortion deaths are treated. In its statistical aspects this subject occupies such a special position that it can be more suitably discussed apart from the main problems. It is commonly recognized that the usual practice of relating abortion deaths, which now aggregate a considerable ratio of the total of all maternal rates, to the ordinary live birth numerator is unsatisfactory so far as the reference not only fails to convey any measure of the risk to the total of those exposed, but it is open to the objection that by being related to a group with which it is in no way connected it is meaningless and even deceptive. The common practice of thus dealing with abortion deaths in a manner similar to that employed for all other maternal deaths is, of course, derived from the fact that in the absence of a knowledge of the total number of pregnancies they must be related to those pregnancies which alone are known, namely, those registered (that is to live births or to total births). In this way they are treated like those other conditions in which pregnancy is likely to end prematurely and to which, therefore, the same objections apply (ectopic pregnancy, etc.).

It is of the greatest importance that we should recognize, however, that in its magnitude abortion creates a problem of its own and that in the manner of its treatment it constitutes one of the major factors undermining the comparability of maternal rates. We may in general conclude that in proportion as the number of abortions in a community increases, so the total number of births diminishes, and vice versa. From this it arises that, by relating abortion deaths to live births in a community in which the total abortions are increasing, we are year by year relating to a group of diminishing births an increasing number of abortion deaths and thus obscuring the statistical significance of the data. We can most easily realize the meaning of this phenomenon if we conceive of a small community with an annual rate of 2,000 live births and 500 abortions. If we assume that the abortion rate increases by 500 per year, and that 1 death occurs in every 500 abortions, we get the result as shown in Table I.

Birth certificates for 90 per cent of the 890 defective individuals for whom death certificates were available also were located.

An attempt was made to interview the mother of each of the 890 deceased individuals, the visits being made in the summer of 1934 by 3 fourth-year medical students. A complete reproductive history was secured from each mother that could be located—which included data upon the month of conception of all pregnancies. More than 540 mothers were interviewed.

The facts found in: (a) the birth and death certificates of the 890 defective children, and (b) the information secured from the mothers, gave data for the month of conception of 2,525 offspring.

Some of the 2,525 pregnancies ended in abortion or miscarriage. The embryos in such cases were considered to have been normally developed unless there was definite information to the contrary.

The 2,525 individuals included 1,590 normally developed children, and 935 that were known to be congenitally malformed. Of the 935 defective children, 45 were discovered as a result of the home visitation. Most of these were dead, though 17 were still alive at the time that the home visits were made.

RESULTS

The malformations met with in the 935 defective children are classified in Table I; in more than 75 per cent of cases, the defect involved the body surface.

TABLE I. CHIEF DIAGNOSIS OF EACH CONGENITALLY MALFORMED INDIVIDUAL

A classification of the defects of the congenitally malformed individuals for whom month of conception was determined. Each person assigned a single diagnosis, the latter being the most severe one in cases where two or more defects were present.

SYSTEM	INDIVIDUALS	
	NUMBER	PER CENT
Reported	935	100.0
Nervous	567	60.7
Gastrointestinal	139	14.9
Cutaneo-musculo-skeletal	103	11.0
Cardio-vascular	80	8.5
Monsters not described	28	3.0
Urinary	10	1.1
Respiratory	3	0.3
Ill-defined	5	0.5

That the defects in most instances were serious is indicated by the ages of the defective children at the time of death. Of the 935 malformed individuals, 233 (24.9 per cent) were stillborn; 586 (63.5 per cent) died *under* one year of age; 98 (10.0 per cent) died *after* one year of age. In one case, the age was unstated, and only 17 defective individuals were living at the time that the study was made.

fallacious nature of our present system and, more especially, the fact that its retention strikes at the root of any effort to standardize maternal death rates on an international basis.

MATERNAL MORTALITY

Within recent years the reports which have appeared in Great Britain and in the United States of the analysis of the factors responsible for maternal death have provided us with a considerable volume of new knowledge on these subjects. The Interim Report of the Departmental Committee on Maternal Mortality and Morbidity of the British Ministry of Health (1930) dealt with 2,000 and the final report of the same committee (1932) with 3,805 deaths. Following these there appeared the report on Maternal Mortality in New York City conducted by a committee of the New York Academy of Medicine under the directorship of Dr. Ransan S. Hooker.⁴ This was published in 1933 and dealt with all the puerperal deaths, numbering 2,041, which occurred in New York City during the years 1930 to 1932. The Philadelphia County Medical Society⁵ in 1934 issued an analysis of 717 deaths occurring between 1931 and 1933 which was carried out under the chairmanship of Dr. Philip F. Williams. The report of the Children's Bureau of the United States Department of Labor on Maternal Mortality in Fifteen States⁶ which was published in 1934 is based on a study of 7,537 deaths. Finally, within recent weeks the Department of Health for Scotland has published a Report on Maternal Morbidity and Mortality in Scotland.⁷ This is based upon an investigation of 2,527 deaths occurring between 1929 and 1933 and upon an inquiry into the circumstances attendant on 39,205 births occurring in Scotland during the first six months of 1934. This latter inquiry, which introduces an important and novel feature into this class of investigation, was planned with the object of gathering information on the incidence of morbidity and on the factors contributing to sickness and death in association with child-bearing and childbirth.

In the mass these six reports have assembled for our study data provided by an analysis carried out by skilled observers of the individual circumstances surrounding the deaths of 18,627 women. It is true that in many instances the data were not sufficient to permit of a precise decision regarding the causal factors. Moreover, the more complete study of the cases instituted by the various committees resulted in the discovery of a considerable inaccuracy in the original certification as to the cause of death. In the New York Report the percentage of this error was 17.8, in the Philadelphia Report 21.6, and in that of the United States Department of Labor 12.6. The discovery of this high incidence of erroneous certification bears out in a striking manner the contention advanced in the previous pages that ordinarily compiled maternal death rates are largely valueless for purposes of clinical comparison.

Chartometer measurements of the barographic records made in the Philadelphia local office of the United States Weather Bureau during

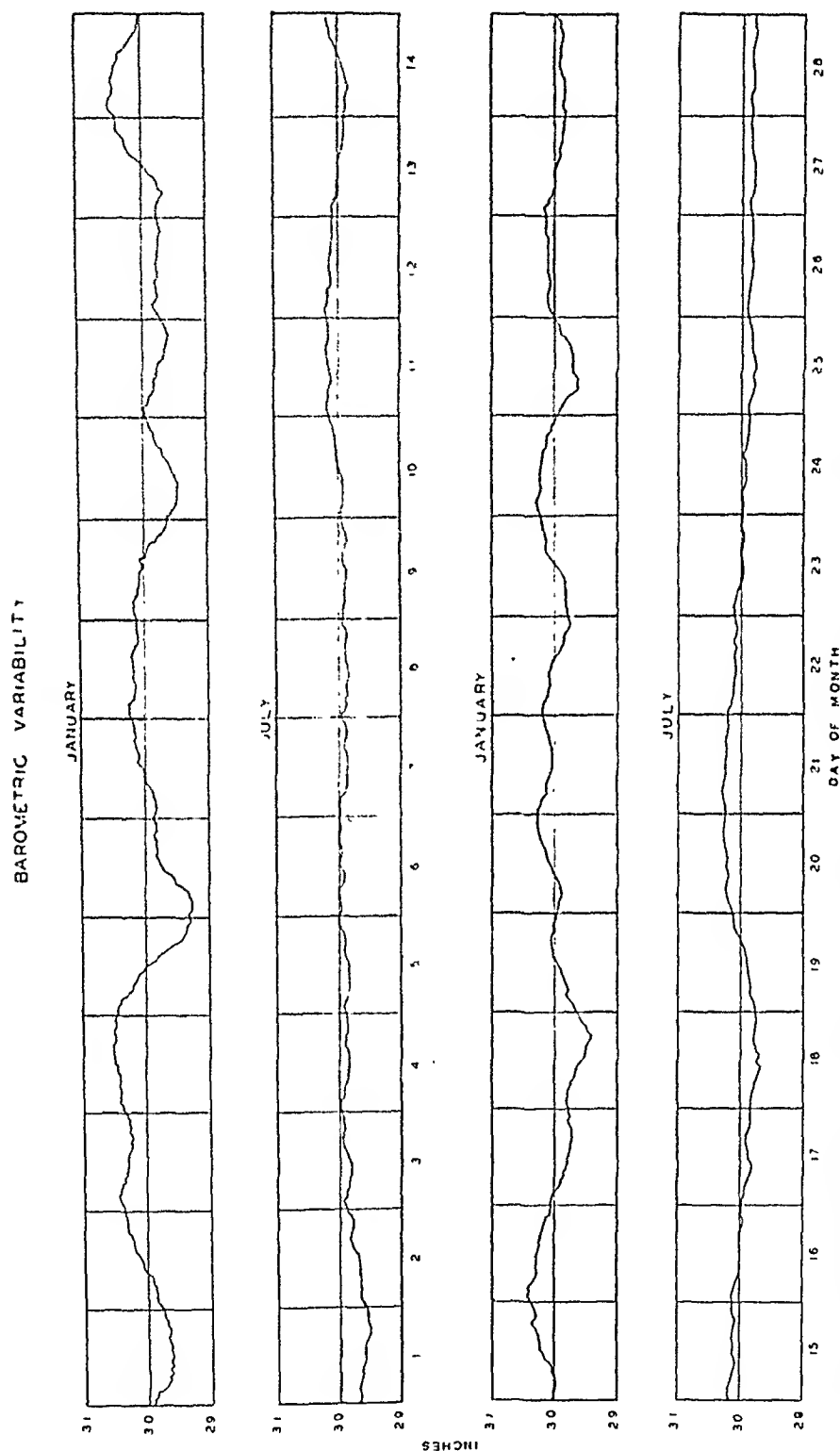


Fig. 2.—Tracings of records made by barograph in the Philadelphia local office of the United States Weather Bureau during the first twenty-eight days of January and July of the year 1929, respectively. Barometric variability was greater in January of 1929 than in any other month during years of 1928 to 1933, inclusive. A tracing of the month of July of the same year is shown as a sample of a quiet pressure change period. Note slowness of pressure changes even in month of January.

the years 1928 to 1933, inclusive, indicate that in this region, the greatest barometric variability is met with in January, and the period of least variability in June, July, and August.

The second group of maternal deaths, to which on this occasion I would especially bespeak your attention, we may rightly regard as constituting the greatest challenge to the modern art of obstetrics. By this I mean the case of the young, healthy woman with no obstetric abnormality or at most possessing some condition of relatively minor significance, who is slaughtered on the eve of the event on which all her thoughts to the last moment have been confidently centered. We have no means of estimating with any accuracy the extent to which this, surely the most tragic of all obstetric events, contributes to the maternal death rate, but there is evidence to suggest that it constitutes one of the main single causal factors. Its consideration is the most urgent concern of obstetricians and publicists in that it relates to the most preventable of all maternal mortality.

THE PRESENT ORGY OF OBSTETRIC INTERFERENCE

A study of the British and American reports conveys the impression that one of the most sinister features of modern Anglo-Saxon midwifery is to be found in the extent to which interference with the course of labor is practiced. There is now a considerable body of reliable evidence to show that in at least 90 per cent of all midwifery the delivery is capable of being effected by normal uterine effort. This figure is for most areas probably an underestimate; Plass⁸ in this country and Oxley⁹ in London have computed that at least 94 to 95 per cent of all deliveries should be normal and spontaneous. These figures may be regarded as expressing within reasonable limits the conditions that apply generally to the United States and Great Britain. At the same time it is not without significance for our present purpose that in some countries with highly developed obstetric services the extent of mechanical interference is even smaller than that connoted by these figures. Thus, in Sweden the interference rate is 3.2 per cent, in Denmark it is 4.5 per cent, while in Holland, which possesses an obstetric service of a high standard, the rate in those areas where it is ascertainable is under 1 per cent.

In sharp contrast with these conservative figures we find that the New York Committee estimated that 20 per cent of the deliveries (69,665 out of a total of 348,310 live births) were operative, and that in this group the total death rate was 10.5 per 1,000 and the sepsis death rate 4 per 1,000, as compared with a total rate for spontaneous delivery of 2 per 1,000 and a sepsis rate of 0.8 per 1,000. One of the most striking facts revealed in the New York Report is the high proportion of the deaths (19.8 per cent of the total) that followed cesarean section. Further, there is evidence that within recent years there has been a marked increase in this operation; in some hospitals this increase was as high as from 500 to 1,200 per cent. The Philadelphia Committee arrived at very similar findings.

The extent of operative interference in England and Wales has so far not been capable of assessment, but it is well known that in these

IS THE OVAL OR FEMALE TYPE PELVIS A RACHITIC MANIFESTATION?

HERBERT THOMS, M.D., NEW HAVEN, CONN.

*(From the Department of Obstetrics and Gynecology, Yale University School
of Medicine)*

IN A recent communication¹ I discussed the question "What Is a Normal Pelvis?" and pointed out that our recent knowledge of pelvic variations has shown that the occurrence of the oval or female type pelvis in women is by no means as great as hitherto supposed. In a recent study I demonstrated that in 135 consecutive primiparous patients this type occurred in but 51.8 per cent, while the round and anthropoid types occurred in 48.2 per cent of the series. This corresponds with the findings of Caldwell, Moloy, and D'Esopo² who, in a series of 215 cases, found the gynecoid or female type in 53.9 per cent.

In the communication first referred to I suggested that the oval or female type pelvis might in reality be a result of mild rachitis occurring in early childhood or at puberty. To quote; "the predominant type of pelvis which was formerly seen in clinics may have actually changed in character within a generation. When alterations are considered in environment surrounding female infants and adolescent children during the past twenty-five years, changes brought about not only by a great difference in diet, but by such influences as outdoor exercise and life in the open, it must be admitted that the environment for this group has changed indeed during that period. When one further considers the sedentary habits, the type of clothing, the diet, and general restrictions that previously were a part of the life of female infants and children, may one not speculate as to the effect of such an environment on the adult form of the female pelvis. That changes in environment can effect skeletal changes in a large proportion of a population is witnessed in recent years by the extraordinary lessening of the incidence in children of severe rachitis." In this communication also I mentioned the suggestions of Stoney³ and Vaughan⁴ that oval pelvis are not truly the result of racial influence but are caused by conditions of life in modern civilization. I wish again to quote Hess⁵ and his associates who state that "Although the incidence and severity of rickets in the United States has decreased in the last five or ten years, it must not be thought that it has become a negligible disorder. A clinical survey of rickets which we carried out this winter (1930-1931 in New York City) among the poor who

of some large individual practices, which have an advantage not possessed by such national statistics as those to which we have just referred, in that they are capable of closer analytical scrutiny. For the East End Maternity Hospital, which engages in an outdoor and indoor practice in a poor slum of London, Oxley has from time to time published records of great value. For the purpose of this communication he has kindly provided me with a statement of the figures relating to his last 20,060 successive labors. (The hospital does not deal with abortions, and it is for the most part engaged in the care of its own "booked" cases.) Out of this total about 19,000 cases terminated in normal and spontaneous labor, with 1 death due to pulmonary embolism, giving a mortality rate of 0.005 per 1,000. There was no mortality from sepsis! The mortality rate for the entire series of 20,060 deliveries, and including all abnormal and emergency cases, was 16 or 0.7 per 1,000.

It is perhaps necessary to indicate that I do not, of course, infer from these strikingly successful records that the sole factor making for routine obstetric safety is the abstention from unwise mechanical intervention with the course of normal labor. It is obvious that results of this high order are attainable only when the whole service, antenatal, intranatal, and postnatal, is efficient and is capable of dealing adequately both with normal and abnormal cases. It is, also, abundantly clear to any student of the obstetric problem that efficient machinery for one aspect of the service implies necessarily a high standard throughout the various elements, midwife, doctor, specialist, and hospital. My object in directing your notice to these facts is to demonstrate that sound midwifery implies as a necessary corollary a rigid protection of the normal case against the zealous intervention that brings tragedy in its train. Only thus can we hope to rescue modern obstetrics from the indictment on which it stands arraigned before the tribunal of public opinion, namely, the extent to which young and healthy women in the prime of their usefulness to the family and the State are being continually and needlessly sacrificed on the altar of motherhood.

When we pause to analyze the factors responsible for the increasing tendency to interference, the obstetrician is brought face to face with difficulties which are often incapable of being expressed in the ordinary formulas of his art. Indeed, in their nature and their magnitude, these difficulties are so formidable, and they have engaged the serious attention of so many previous and so many experienced observers, that I hesitate to attempt any adequate treatment of the subject.

TABLE I. FEMALE TYPE SERIES

CASE	SUPERIOR STRAIT		PUBIC POR- TION	ILIAC POR- TION	DIFFERENCE
	ANT. POST. DIAM.	TRANSVERSE DIAM.			
1	11.25	13.25	7.5	5.75	-1.75
2	11.25	13.5	7.5	6.5	-1.0
3	10.25	12.0	7.25	5.5	-1.75
4	9.75	11.75	6.75	5.25	-1.5
5	11.5	13.75	8.25	6.0	-2.25
6	11.5	13.5	8.25	6.0	-2.25
7	10.5	13.5	7.25	5.75	-1.5
8	10.5	12.5	7.0	6.0	-1.0
9	11.5	13.0	7.75	6.0	-1.25
10	11.0	13.25	7.5	6.25	-1.25
11	10.25	13.00	8.0	5.5	-2.5
12	9.75	12.25	7.25	5.25	-2.0
13	10.75	12.75	8.00	5.75	-2.25
14	11.25	13.5	7.75	6.75	-1.0
15	12.0	14.0	8.25	7.0	-1.25
16	11.0	13.25	7.75	6.5	-1.25
17	11.25	13.5	7.75	6.75	-1.0
18	11.0	12.5	7.75	5.50	-2.25
19	9.75	12.0	6.25	5.5	-0.75
20	11.25	13.0	7.75	6.0	-1.75
21	11.5	13.75	8.5	6.25	-2.25
22	10.75	13.5	7.0	6.25	-0.75
23	11.5	13.5	8.0	6.25	-1.75
24	11.5	14.25	7.25	6.5	-0.75
25	11.0	13.0	7.5	6.25	-1.25

TABLE II. ROUND AND ANTHROPOID SERIES

CASE	SUPERIOR STRAIT		PUBIC POR- TION	ILIAC POR- TION	DIFFERENCE
	ANT. POST. DIAM.	TRANSVERSE DIAM.			
1	12.75	13.25	7.75	7.75	0.0
2	11.5	11.75	6.5	6.5	0.0
3	12.0	12.0	6.75	6.5	-0.25
4	12.75	12.75	7.25	7.0	-0.25
5	11.5	12.25	7.0	6.75	-0.25
6	12.5	12.75	7.25	7.0	-0.25
7	12.0	12.0	7.5	7.0	-0.5
8	12.25	13.0	7.0	7.0	0.0
9	11.75	12.25	7.0	6.5	-0.5
10	12.0	12.5	7.0	7.0	0.0
11	12.0	13.0	7.25	7.25	0.0
12	10.75	11.0	6.75	6.5	-0.25
13	11.5	11.5	6.5	6.5	0.0
14	11.75	12.75	7.0	6.75	-0.25
15	10.0	10.75	6.0	5.75	-0.25
16	10.5	11.25	6.75	6.5	-0.25
17	14.0	12.25	7.75	7.75	0.0
18	13.0	12.0	7.25	7.0	-0.25
19	10.75	10.25	6.25	6.0	-0.25
20	13.0	12.5	7.0	7.0	0.0
21	12.75	12.0	7.0	7.0	0.0
22	14.0	13.25	8.0	8.0	0.0
23	13.5	12.5	7.0	7.0	0.0
24	14.0	13.0	8.0	7.75	-0.25
25	12.5	12.0	7.0	7.0	0.0

By contrast with the course followed in Great Britain, in the Netherlands, and in Scandinavia, the midwife succeeded from the beginning in maintaining her primary position in the obstetric hegemony. During the eighteenth century, when, in other countries, the supremacy of the man midwife led to the woman practitioner being relegated more and more to the background, in Europe the midwife, by adapting herself to the new progress, succeeded in retaining and consolidating her position. Important schools for the training of midwives were established and in the large midwives' school in Copenhagen we can read to this day the records of a continuous history dating through more than a century and a half and containing an unbroken list of the women who during that period have obtained their instruction within its walls. The large, well-organized and well-staffed schools, where today the pupils are trained intensively during a period of two, and, in Holland, three years, are the culmination of a historical sequence which has firmly entrenched the woman midwife in her present position of authority and responsibility.

Where through many generations a country has depended upon the midwife, whose experience and skill have sufficed for the overwhelming proportion of childbirth, it follows that the art in its essential features must present many differences from that which has grown up round "handy-woman" and doctor. It is inevitable that in the former case the emphasis on anesthesia has been slow to develop, and it is equally inevitable that the whole momentum of the service should be directed toward the encouragement of spontaneous childbearing. Reviewed in this light we cannot fail to recognize that the features of Anglo-Saxon midwifery, which today create so much concern, have evolved as the natural outcome of a history dating back two hundred years and that it is idle to seek for their origin in the ineptitude of the modern doctor or in recent surgical or social developments. With the control and the bias placed where they are, these recent changes have merely operated to encourage, or rather to precipitate, a tendency toward regarding childbirth more and more as a surgical process instead of a physiologic act.

There are several strong advantages inherent in a maternity service which is based on the well-trained midwife. In the first place, this arrangement is the readiest and generally the only means by which it is economically possible to build up the *ad hoc* machine, with that intimate coordination of all its various elements, which in the opinion of most observers is essential to the solution of the maternity problem. The existence of a band of midwives provides the stable foundation of such a scheme. In the second place, it supplies the economic means of training a personnel specially fitted for the attendance on ordinary natural delivery, constituting, as it does, about 90 per cent of the total. It is impossible to gainsay the fact that the midwife trained, for example,

iliac portion of the line of terminal length is consistently shortened. Whether this is the result of the occurrence of rachitis, probably in a mild form, at some time during the childhood of the individual may be conjectured.

From available information concerning pelves in aboriginal people living in climates in which rachitis does not occur, it appears evident that the round type pelvis is greatly predominant. Furthermore, it seems apparent that the unusual incidence of the round and the anthropoid types in the women of our population must be explained on grounds other than those based on such influences as race and constitution. The above study would appear to be important evidence toward a definite answer to this problem.

REFERENCES

- (1) *Thoms, H.*: J. A. M. A. 102: 2075, 1934. (2) *Caldwell, W. E., Moloy, H. C., and D'Esopo, D. A.*: AM. J. OBST. & GYN. 6: 824, 1934. (3) *Stoney, F.*: Brit. J. Radiol. 3: 345, 1930. (4) *Faughan, K.*: Brit. M. J. 2: 939, 1931. (5) *Hess, A. F., et al.*: J. A. M. A. 97: 370, 1931. (6) *Breus, C., and Kolisko, A.*: Die Pathologischen Beckenformen, Leipzig u. Wien., 1904.
-

IRRADIATION OF THE PITUITARY GLAND IN THE TREATMENT OF MENOPAUSAL SYMPTOMS

CONRAD G. COLLINS, M.D., M.S., E. PERRY THOMAS, B.A., M.D., AND
LEON J. MENVILLE, M.D., NEW ORLEANS, LA.

(From the Hutchinson Memorial Clinic and Departments of Gynecology and Roentgenology, Tulane University, School of Medicine)

THE treatment of neoplastic lesions, commonly occurring at the climacteric, has aroused a tremendous amount of discussion in the literature, and has, rightly, obscured a consideration of the menopausal symptoms, themselves. Hot flushes, sweating, and nervousness, while of no serious moment because they do not harbingers a dangerous condition, are nevertheless quite often of such severity that they cause more discomfort and more true suffering than a serious disease process. Because these symptoms disappear spontaneously later in life and because they, too often, are attributed solely to neurotic origin, they are dismissed by the physician without much consideration. The chief purpose of this paper, containing, as it does, so few cases, is to bring to the attention of the profession a much neglected form of therapeutics in the treatment of the symptoms of the menopause.

The menopausal syndrome is definitely an endocrine disturbance as proved by a multitude of experimental work demonstrating abnormalities which occur in many of the glands of internal secretion at this time.

midwife and appreciate that to her they must look to a major extent for the first indications of trouble. Many hospital obstetricians know that the young and enterprising house doctor is likely, unless guided, to import into the labor ward the heroic surgery to which he has been thrilled in the surgical theater. I always remind such youthful enthusiasm that the great William Smellie in his incomparable *Treatise of Midwifery* published in 1752 says of Mrs. Maddocks that she was "a midwife whom I kept on purpose to attend my patients in lingering labours." Could we have a safer guide?

I may be accused that, in my apotheosis of the midwife and all she will stand for in a rehabilitated maternity service, I have closed my eyes to some of the ancillary and often mutually conflicting problems with which we are all painfully familiar. On most of these questions I must deliberately refrain from touching. There are, however, two, namely, the question of anesthesia during labor and the increasing tendency to hospitalization, to which I must make some reference.

The extension to laboring women of the relief of anesthesia is a humane object which commends itself to all obstetricians. At the same time the legal restriction of this beneficent function to the doctor has implied from the beginning that any attempt to realize its full advantages is attended with not insignificant obstetric danger. The induction of anesthesia in response to the dictates of humanity tends inevitably toward the risk that the doctor, in the higher interests of his patient, may be compelled to hasten the delivery of the child. It has thus happened that under existing conditions anesthesia and natural delivery have come to be regarded often as irreconcilable. There can be no doubt that the present well-intentioned attempts to bring the advantages of anesthesia in greater measure to the woman in labor frequently, tend to fix the doctor still more firmly to the obstetric machine under conditions which are neither satisfactory to himself nor in the best interests of his patient. It is true that this impasse is being gradually dispelled by the increasing reliance which can now be placed upon sedatives, the administration of which is often left in the hands of the midwife, although still under the supervision of the doctor. There are some obstetricians, who have closely studied this problem, who maintain that the full measure of security for laboring women can be attained only when the midwife, by virtue of her training and status, is qualified to achieve emancipation in these as in other matters. This is one of the most urgent obstetric questions of the future. It is a matter of interest that in Holland and, more especially, in the Scandinavian countries the public authorities are becoming concerned that the growing demand for anesthesia may seriously imperil the stability of their present systems.

It is a time honored custom to treat menopausal symptoms with sedatives and, in the moderate cases, they afford sufficient relief. Cases of greater severity, which are not few in number, exhibit little or no improvement with these measures and are continually seeking relief at the hands of the physician who, too often, has exhausted his resources in the use of bromides and luminal.

Geist and Spielman,¹⁰ Hamblen,¹¹ and Dodds¹² have reported a series of cases in which women suffering from the symptoms of the menopause were treated with injections of the follicular hormone upon the theory that, if the withdrawal of this hormone initiated the symptoms, its replacement should afford relief. Their results might be summarized in the statement that such treatment affords distinct relief in a good number of, but not all, cases; that it is purely substitutional; and that the symptoms return when the administration is discontinued.

Kurzrok¹³ similarly treated a series of women during the menopause with the follicular hormone but divided his cases into two groups. In one group, before treatment, the follicular hormone could be recovered from the urine, while prolactin could not be demonstrated, showing the persistence of some ovarian function without hypertrophy of the anterior pituitary. In the second group, the follicular hormone was not present in the urine, whereas prolactin was, demonstrating a hyperfunction and hypertrophy of the pituitary and a cessation of ovarian activity. One hundred cases were studied and he concluded that only when the follicular hormone is absent from the urine will relief from menopausal symptoms be obtained by its administration.

The earliest reports of the use of irradiation of the pituitary for the relief of menopausal symptoms are by Groedel¹⁴ in 1922 and by Werner¹⁵ in 1923. The literature covering the subject is small in volume and emanates, almost in its entirety, solely from the continent. Borak^{16, 17} reported a series of fifty cases in 1924 and, in 1929, he reviewed a series of 274 patients, so treated, some of whom had been observed for six years. He reported relief of symptoms in 80 per cent of cases by irradiation of the pituitary alone. In the remaining cases, some improvement followed subsequent irradiation of the thyroid. In 63 per cent of cases, the relief of symptoms lasted longer than six months and from two to four years, while in 27 per cent of cases, the effect lasted less than six months.

To eliminate from his observations the so-called psychic effect of treatment, the one salient argument of critics, Borak interposed a lead screen, sufficient to absorb the rays, between the tube and the patient in a number of cases used as controls. In no case, so controlled, did any change occur in the patients' symptoms. Each of these patients later received a full dose of irradiation, without screening, and relief of symptoms was obtained in every case.

PERSONAL OBSERVATIONS

At the Hutchinson Memorial Clinic, thirty-three patients suffering from menopausal symptoms have been treated by irradiation of the pituitary gland. The technic employed has been the same in all cases.

The irradiation dose for each exposure was 148 r with the following factors: 12 in. D., 5 Ma., 120 K. V. P., 1 Mm. Al and 0.25 Cu, 8 min. The total dosage for each series was 296 r. The first exposure is given through the right temporal region

Philadelphia Report 86.2 per cent of the abortion deaths were ascribed to this cause, while in England and Wales the Registrar-General shows that during the years 1930 to 1932 the percentage was 72.5.

The alarming extent to which willful and criminal interruption of the unwanted pregnancy is responsible for material mortality is a community problem of great urgency. The motive running through what must be regarded as one of the most sinister commentaries on modern life is revealed in its full significance, when we relate it to the problem of illegitimacy. The various reports reveal that abortion constitutes an appallingly high proportion of the puerperal deaths in illegitimate pregnancies. In New York the percentage of the total deaths due to this cause is 44.9, while in Philadelphia, out of a total of 79 deaths in illegitimate pregnancies (giving a relatively enormous illegitimate mortality rate of 20 per 1,000 live births), there were 49 or 62 per cent due to abortion!

I sometimes wonder if as obstetricians we have been sufficiently vocal in regard to the terrible havoc which the practitioners of an illicit art are responsible for spreading throughout our towns, a havoc which, it is admitted, is beyond the power of legal enactments to control. It is surely necessary that the community, which reposes in us the care of its health, should be made to understand the gravity of the present situation. It is true that as a profession we must in our corporate capacity refrain from entering the arena in support of some such State experiment as that introduced in Russia for the legalization of abortion, and thus from assuming to ourselves functions that pertain more to the sociologist and the publicist. The problem has implications of a moral and religious as well as of a social and economic kind which beset any communal effort of this nature. At the same time it is imperative that in the formulation of a policy for dealing with abortion the State should be conscious of the gravity of the medical issues and of the heavy and increasing burden of death and disease which the existing conditions compel it to carry.

REFERENCES

- (1) Final Report of Departmental Committee on Maternal Mortality and Morbidity, London, 1932. (2) Comparability of Maternal Mortality Rates in the United States and Certain Foreign Countries. United States Department of Labor—Children's Bureau. Elizabeth C. Tandy. Washington, 1935. (3) *Gense*: Quoted from Fetal, Newborn and Maternal Morbidity and Mortality, White House Conference on Child Health and Protection, New York, 1933, p. 451. (4) Maternal Mortality in New York City, Commonwealth Fund, New York, 1933. (5) Maternal Mortality in Philadelphia 1931-1933, Philadelphia, 1933. (6) Maternal Mortality in Fifteen States, Washington, 1934. (7) Report on Maternal Morbidity and Mortality in Scotland, Charlotte A. Douglas and Peter L. McKinlay, Edinburgh, 1935. (8) *Plass, E. D.*: *Am. J. Obst. & Gynec.* 22: 176, 1931. (9) *Osby, Phillips, and Young*: *Brit. M. J.*, p. 501, 1935. (10) National Maternity Service Scheme for England and Wales, British Medical Association, London, 1929.

is highest. This has led to the conclusion that estrin, or the female sex hormone, inhibits the secretion of prolactin, and this supposition is the basis of Fluhmann's theory of the hormonal mechanism of menstruation. If this be true, injections of estrin cause a decrease in the concentration of prolactin and, perhaps, the relief of menopausal symptoms in this manner. This is in perfect accord with the findings of Kurzrok, mentioned above in the use of theelin (estrin) in the treatment of this condition.

The dosage of x-ray used in the treatment of the series of cases herein reported is a destructive dose in our belief and causes a decrease in the concentration of prolactin in that manner. Since actual destruction of tissue occurs, the relief afforded is more permanent. If this supposition is true, irradiation of the pituitary should be followed by a disappearance of prolactin from the urine. Unfortunately, no hormonal determinations were made upon these patients. In pursuing this view, it is our intention to determine, in the future, the prolactin content of the blood and urine both before and after irradiation and in this way to advance additional support to this contention or disprove it altogether.

CONCLUSIONS

1. Sedatives, or the follicular hormone, either alone or in combination, will not relieve menopausal symptoms in all cases. Theelin alleviates the majority of these symptoms, but is transient in effect and purely substitutional.

2. Irradiation of the pituitary gland for menopausal symptoms affords more marked relief for a longer period of time and with more lasting effect than any other known type of therapy at present used. It should be employed in all cases where relief is not obtained from sedatives or the follicular hormone.

3. Pathologic, biologic, and physiologic investigations have shown conclusively that hypertrophy of the anterior portion of the pituitary with increased prolactin secretion occurs at the menopause.

4. The supposition is advanced that the symptoms of the menopause are directly produced in large part by the hyperfunction of the pituitary initiated by ovarian atrophy or removal.

5. An attempt will subsequently be made to demonstrate the fact that the relief of symptoms afforded by irradiation is accompanied by the disappearance of excess prolactin and that this is the effect of a destructive dose of roentgen rays to the hypertrophied pituitary.

REFERENCES

- (1) Tandler, J., and Grosz, S.: *Wien. klin. Wchnschr.* 21: 266, 1908. (2) Rossle, R.: *Virchows Arch. f. path. Anat.* 216: 248, 1914. (3) Engle: *Am. J. Physiol.* 88: 10, 1929. (4) Evans and Simpson: *Anat. Rec.* 42: 48, 1929. (5) Fluhmann, C. F.: *J. A. M. A.* 93: 672, 1929; *Fluhmann*: *AM. J. OBST. & GYNEC.* 20: 1, 1930.

certain number of case reports, but these are not very helpful in fixing in the mind of the reader the distinguishing diagnostic characteristics of these various entities.

In the present summary only the salient points are to be considered, with a minimum of references to the new extensive literature of the subject. The basis for the discussion is the study of a rather considerable group of these tumors, most of them from our own clinical material, but not a few sent to us from outside sources. This material includes 42 cases of granulosa cell carcinoma, 5 cases of arrhenoblastoma, 11 of disgerminoma, and 6 of the rare Brenner tumor. It would seem unwise, within the limits of a single paper, to attempt a detailed report or analysis of our own cases, or a review of the now very large literature. Our purpose is rather a missionary one, that is, to epitomize and crystallize the essentials for the benefit of gynecologists and pathologists who have not become familiar with this mass of newer knowledge concerning the histogenesis, the gross and microscopic characteristics, and the symptomatology of these neoplasms. While many investigators have contributed to their study, it seems only fair, and not invidious, to single out for special credit Robert Meyer, whose studies have done so much to clarify our concepts in this, as in so many other fields of gynecologic pathology. For purposes of brevity and readability, references and citations from other authors have been almost entirely excluded from this paper, though a short working list of recent publications is appended.

HISTOGENESIS AS RELATED TO THE EMBRYOLOGY OF THE OVARY

No intelligent conception of the character and significance of any of these tumors is possible without at least some idea of the normal embryology of the ovary. The anlage of the sex gland, either male or female, is developed on the anterior or ventral surface of the wolffian body. In its early undifferentiated phase it appears simply as a small mass of cells covered by the coelomic epithelium, which in this segregated area constitutes the germinal epithelium. In this undifferentiated phase, when it is impossible to determine by histologic examination whether the gonad is to develop along male or female lines, it contains cells which possess no developmental potency along either male or female lines, so that it is conceivable that rests of these "dis-germinal" cells may later give rise to tumors which exhibit no capacity to modify sex characters, cells which from this standpoint are to be looked upon as "indifferent." This, as a matter of fact, is the prevailing viewpoint as to the origin of the so-called disgerminoma which we shall have occasion to discuss in this paper.

none of which developed convulsions. Three treated without nembutal developed convulsions.

The following is a typical case. A. W., aged thirty-six, para vi, was admitted to hospital at 11:30 P.M., complaining of cramplike pains every five minutes in the lower back and abdomen and an intermittent watery discharge from the vagina since early morning. Abdomen overdistended, muffling the fetal heart sounds. Interne's impression, preeclampsia, polyhydramnios. Blood pressure 190/130; urine negative; Fouchet test positive; sedimentation rate 30 mm. in forty-five minutes; eyegrounds negative; Wassermann negative; phenolsulphoneplthalein test 40 per cent. Diagnosis: Labor at term, polyhydramnios, preeclampsia.

At 12:30 A.M. patient was given three nembutal capsules per os; 1:30 A.M. patient exceedingly restless. At 1:45 patient lapsed into semicomatose state; 2:00 A.M. fetal head presented; 2:10 A.M. an apparently normal live infant born; 5:15 A.M. patient sleeping; 7:00 A.M. patient complained of severe pains in abdomen; 10:00 A.M. two nembutal capsules ordered given per os, b.i.d.; 11:00 A.M. patient drowsy. Thereafter the patient was comfortable; no further complaints. The nembutal was discontinued on the fourth day postpartum. The blood pressure progressively dropped to 110/70. The patient and infant were discharged in good condition on the thirteenth day postpartum. There were no convulsions.

In twenty-four treated cases of eclampsia (twenty-three of which had no prenatal care) the use of nembutal promptly stopped and completely controlled the convulsions; whereas, morphine sulphate given repeatedly failed to do so in two cases. Nembutal was administered either intravenously 0.2 gm. in 4 c.c. normal salt solution followed by six to eight capsules per rectum or ten to twelve capsules, per rectum, only.

The following case is typical of the eclampsias in which nembutal was employed: B. H., aged seventeen, primipara, brought into hospital on stretchers at 1:45 P.M., drowsy, having had one convulsion with loss of consciousness two hours before entering the hospital. Interne's impression, eclampsia. Blood pressure 170/120; temperature normal; urine four-plus albumin, sp. gr. 1.021, otherwise negative; Fouchet test negative; sedimentation rate 24 mm. in forty-five minutes; eyegrounds, left eye, negative; opacities in refractive media of right eye prevented observation of fundus; Wassermann negative; no test done for renal function. Diagnosis: pregnancy at term, eclampsia.

At 4:45 P.M. patient had another convulsion lasting three minutes; 5:20 P.M. 10 nembutal capsules were given per rectum; 7:00 P.M. patient unconscious and quiet; 10:35 P.M. patient restless, apparently having labor pains; 1:00 A.M. to 4:00 A.M. resting quietly; 7:15 A.M. patient still unconscious but restless at intervals of every two minutes, apparently having severe labor pains. Inspection showed perineum bulging; 7:50 A.M. patient delivered an apparently normal live infant. At 12 noon patient still unconscious; 1:15 P.M. patient restless; 2:15 P.M. 4 nembutal capsules were given per os; 3:00 P.M. patient resting quietly; 8:00 P.M. patient semi-conscious. From 12:00 P.M. to 6:00 A.M. patient slept with slight restlessness and at 6:00 A.M. condition improved, talking; 9:30 A.M. patient much improved, cooperative, and asked for water and food when wanted. No further complaints. There was a gradual fall in the blood pressure to 122/84. The mother with her baby was discharged as cured on the twelfth day postpartum. There were no more convulsions after the first use of nembutal. It must be understood that in all our cases other active measures for combating the toxemia were included.

neal surface in these structures. At times, too, especially in the ovaries of young children, tubular inclusions are encountered in the cortex. These structures are here stressed because from these so-called Walthard cell nests there may develop a type of tumor which, as might be expected, is made up of sexually indifferent cells, so that no effect is produced upon secondary sex characteristics of the individual. This is the Brenner tumor, so-called, of which we shall have more to say later.

What has been said represents in very sketchy outline the prevailing viewpoints with regard to the histogenesis of these four types of tumors. They are not urged with any degree of dogmatism, because in most respects they cannot be proved, and yet they conform with what we know as to the histology, life history, and biologic properties of these tumors, so that they afford the best available working hypothesis for their study. It is easy to see how this question dovetails into that of sex differentiation in general, and how possible it is that an increasing knowledge of the endocrine aspects of the latter problem may modify our views of the origin of certain of these tumors.

GRANULOSA CELL CARCINOMA

This group constitutes by far the largest of the four under discussion, and may fairly be spoken of as rather common. For example, we have encountered 42 cases in a series of 300 malignant ovarian tumors (14 per cent). This high incidence, it should be added, is partly explained by the fact that a considerable number of granulosa cell tumors, as well as of other special tumors, are included which were sent to our laboratory for diagnosis, so that the cases are not clinically consecutive, and the above figures do not represent the real incidence of these tumors. Kjaften found these tumors to constitute about 10 per cent of a large series of primary ovarian cancers (19 of 188), presumably consecutive. Inasmuch as the granulosa cell tumors have been rather fully discussed in a recent paper from this laboratory (Novak and Brawner), only a short epitome of their characteristics is necessary here.

Clinical.—These tumors may occur at any age, though in our own experience the majority have been observed during reproductive life. They are quite frequent, however, in women beyond the menopause, and may also be encountered in infancy or childhood. The symptoms are those produced by other ovarian tumors, plus certain interesting biologic effects clearly due to the production of estrin by the cells of the tumor. These hormone symptoms are manifested upon the menstrual function and the secondary sex characters. To interpret them properly one must remember the differences in the effects of estrin depending upon the age of the individual. During the reproductive phase the secondary sex characters of the woman are well established, and the organism is well supplied with estrin, so that the addition of a

CYSTITIS EMPHYSEMATOSA

REPORT OF CASE

RAYMOND S. ROSEDALE, M.D., M.S.(MED.), BUFFALO, N. Y.

(From the Department of Pathology, Buffalo City Hospital and the University of Buffalo Medical School)

THE pathology and literature concerning cystitis emphysematosa has been well reviewed by Mills,^{1, 2, 3, 4, 5} Hueper,⁶ Putschar,⁷ and recently Sanes and Doroshov,⁸ so that our purpose in this communication is to report only the essentials of one additional case; not more than thirty cases have been described previously.



Fig. 1.—Drawing of the dissected bladder. Note the size, form, and distribution of the gas vesicles.

K. F., a white female, sixty-eight years of age, was admitted to the Buffalo City Hospital Oct. 5, 1934, complaining of pain in the lower abdomen, nausea, and vomiting, lasting one week.

The pupils were irregular, unequal, and did not react to light. There was congestion in both lung bases. A precordial systolic murmur and an aortic diastolic murmur were present. The blood pressure was recorded as 200/40. The abdomen was slightly distended, tender, and tense. The interphalangeal joints were enlarged.

sumption that the tumor actually produces the hormone as does the normal follicle. Finally, the prompt disappearance of these biologic effects upon menstruation and sex characters after removal of the tumors would seem to clinch the matter. Additional proof has been furnished in one or two cases by the reappearance of the symptoms with recurrence of the tumor in the other ovary and disappearance again with removal of the second tumor.

As regards the malignancy of these tumors, the general statement seems justified that while these tumors must be looked upon as malignant, there is marked individual variation in this respect, and the degree of malignancy of the group as a whole is certainly much less than that of ovarian cancers in general.

Pathology.—Granulosa cell tumors may be of any size, some being very tiny, perhaps only a few millimeters in diameter, others being of

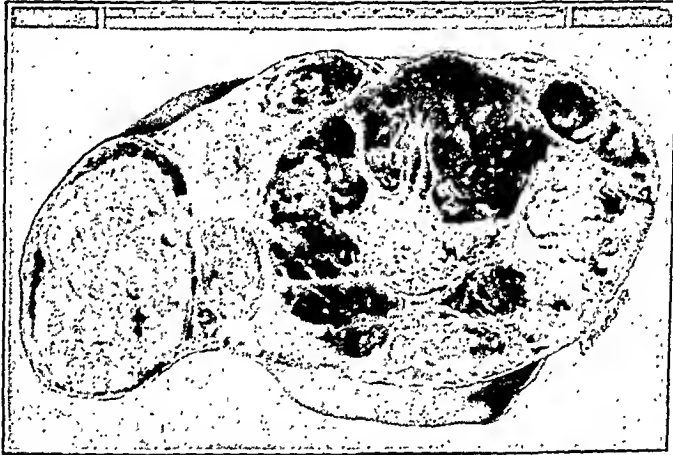


Fig. 1.

enormous size. The most commonly encountered tumors are of moderate size, of ovoid or kidney shape, solid or partly cystic. The cut surface often shows many small cystic cavities, and presents a rather granular consistency. The color is dominantly grayish, but there may be areas of a yellowish hue.

After all it is the microscopie appearance of these tumors which is most important from the standpoint of diagnosis, and this is perhaps the most difficult aspect to set down in black and white. The chief reason for this is the fact that the morphology and architecture of these tumors is so protean. This has led to their subdivision into many different types, and some of these vary so pronouncedly in their microscopie appearance that it is difficult to convince the casual observer that they belong to one and the same family.

In the most commonly encountered variety, the diagnosis can be readily made on the basis of the morphologic identity or resemblance of

mucosal surface except immediately around the ureteral orifices. These vesicles varied in size from pinpoint to some as large as 1 cm. in diameter. The crests of

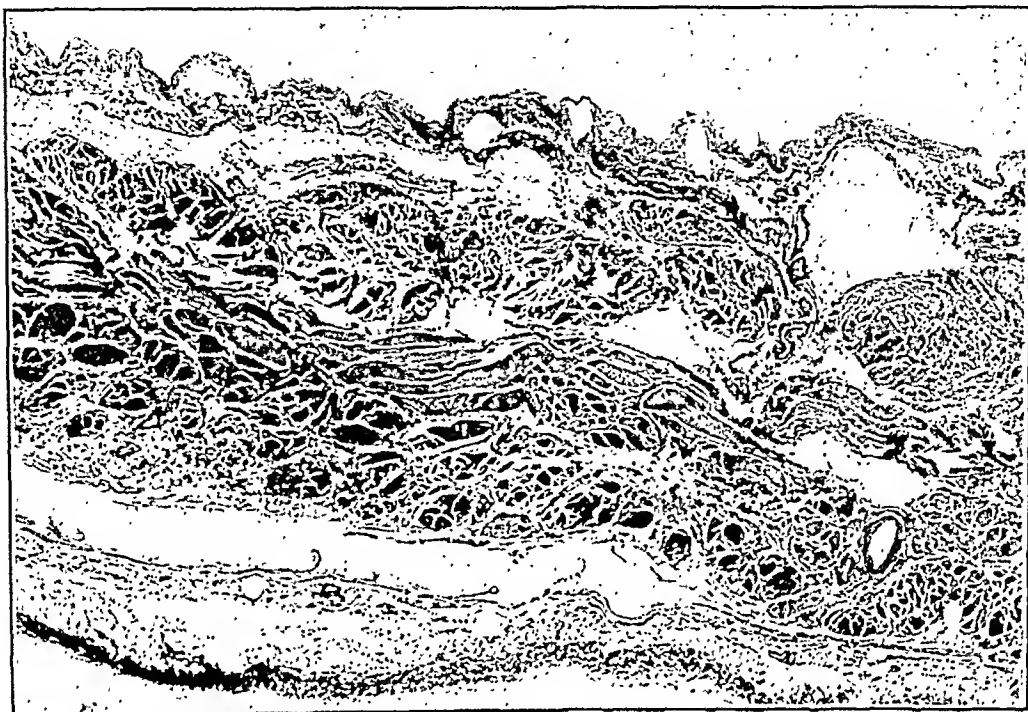


Fig. 3.—Photomicrograph 40X. Gas cysts are present in the lamina propria and upper portion of the muscularis. The serosa and subserosa are partly separated by artifact.

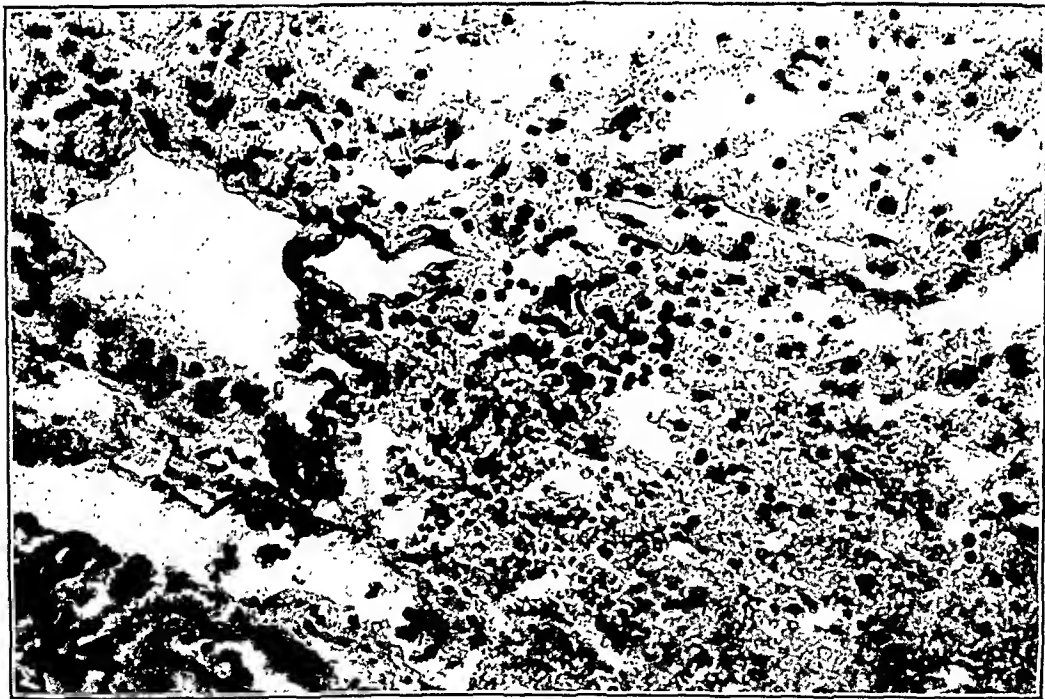


Fig. 4.—Photomicrograph 350X. Showing the hemorrhage in the interstitium.

some of the latter were elevated 4 mm. above the adjacent mucosa. In the left half of the bladder, particularly above the trigone, the mucosa was of a ruby red color, and within this field there were distinct small hemorrhagic areas.

tern and in the production of various subtypes, which in the past have been mistaken for other tumors. The connective tissue may be very abundant, and it shows a strong tendency to hyalinization and liquefaction. The splitting up of the fields of granulosa cells into cylinders or columns by connective tissue trabeculae produces the so-called cylindromatous type, formerly often diagnosed as cylindroma of the ovary or endothelioma. In the same way the convolutions and the liquefaction of the connective tissue may give rise to the gyriform or the adenoma-like varieties of the tumor.

None of these forms, however, are difficult of recognition to anyone who has had the opportunity of studying even a comparatively small material, especially as one soon learns other identifying features, such as the frequent palisade-like arrangement of the cells in long columns or strands. Nor is there any great difficulty, as a rule, in the diagnosis of the type often alluded to as folliculoma malignum. In this, large scattered globular collections of cells may be seen, which because of central degeneration may bear a superficial resemblance to follicles. As a matter of fact, this central degeneration may bring about an ovum-like appearance in the interior of these cell masses, though there is no disagreement now that cystic liquefaction is responsible for this simulation of ova within follicles. In some cases the liquefaction is so extensive as to produce large cystic cavities. From the standpoint of microscopic diagnosis, the folliculomatous variety must be distinguished from a totally different tumor, the oöphoroma folliculare or Brenner tumor, though the differentiation is commonly easy, as we shall later discuss.

More difficulty may be encountered in the recognition of those types of granulosa cell cancer in which there has been a marked departure from the characteristic morphology of granulosa cells. It cannot be too strongly stressed that the examination of as many sections from as many areas of the tumor as possible is of the greatest importance in the study of all these cases, for the widest variations are encountered in individual tumors, and it is rare not to find telltale evidence of the true nature of the growth in some area or other of its extent.

From what was said in the early part of this paper as to the probable origin of the granulosa epithelium from the ovarian mesenchyme, it is not surprising that many tumors present areas which are quite typically sarcomatous, and which to all intents and purposes, are sarcomatous. Almost always the true nature of the tumor can be determined by the study of other fields or sections, it being quite common to find in one and the same section elements which are typically epithelial and elements which are typically of connective tissue character. In our previous paper we have elaborated upon this intermutability, which we think is explainable on embryologic grounds, and which we believe furnishes adequate grounds for including all these varieties

suggested *B. welchii*, and gram-positive cocci were found. No organisms were seen in the muscle layers or lamina propria in the same sections, or others stained by the same method.

COMMENT

The cystitis emphysematosa in this case, similar to some others previously reported, developed in the course of an infection elsewhere in the body. Also, as in some of the other cases, no organisms were recovered from the gas cysts.

On first thought one might consider the cystitis emphysematosa in our case to be due to septicemia. The absence of gas-producing organisms by stain and culture, in the cysts, their walls, lamina propria and muscle layers would indicate that this was not so. Likewise the absence of any foaminess of the liver and microscopically, the absence of gas vesicles in this and other organs would indicate that the emphysematous lesion was localized in the bladder and not part of a generalized disseminated gas producing infection. *B. coli* and *B. welchii* are common postmortem and terminal invaders in the spleen, especially in the presence of peritonitis from perforation of hollow viscera, and are so regarded here.

Causative microorganisms were not demonstrated in the cystitis emphysematosa in this case. It has been stated by J. A. McIntosh⁹ that if the gas from such cases is inflammable it has been developed by the action of *B. welchii*. The author has had no experience in this regard but wishes to point out that the gas in the vesicles in this case could not be ignited in several trials.

It has been stated usually that the vesicles were lined by endothelium, and the cysts have in some instances been regarded as lymphatic channels containing gas. In this case it could not be satisfactorily demonstrated that any lymphatics were involved, and furthermore none of the regional lymph nodes exhibited evidences of emphysema.

In more than half the number of reported cases there has been diabetes, or glucose in saline has been administered by elysis. The individual in the case reported here received 50 gm. of glucose intravenously four hours and forty minutes before death. We feel, as first expressed by Hueper, and amplified by Sanes and Doroshow, that the increased glucose in the urine and bladder tissues may be an etiologic factor, and that here, as in other cases, notably that of R. G. Mills, the trauma of catheterization also may be considered.

Acknowledgment is made to Dr. W. F. Jacobs for his review of the material.

REFERENCES

- (1) Mills, R. G.: J. Urol. 23: 289, 1930. (2) *Idem*: J. A. M. A. 94: 321, 1930.
- (3) *Idem*: J. Urol. 24: 217, 1930. (4) *Idem*: Surg. Gynec. Obst. 51: 545, 1930.
- (5) *Idem*: AM. J. OBST. & GYNEC. 20: 688, 1930. (6) Hueper, W.: Am. J. Path. 2: 159, 1926. (7) Putschar, W.: Handbuch der Speziellen Pathologischen Anatomie und Histologie, Berlin, 1934, Julius Springer, VI/2: p. 371. (8) Sanes, S., and Doroshow, G. D.: J. Urol. 32: 278, 1934. (9) McIntosh, J. A.: Discusant of R. G. Mills paper (Ref. 2).

Lefevre, H., and Blanc, H.: A Case of Acute Dilatation of the Ureter Following a Circumscribed Abscess in the Base of the Broad Ligament, Bordeaux Chirurgical 16: 129, 1935.

A case of acute dilatation of the left ureter, subsequent to an abscess in the broad ligament, is described. The authors, however, do not consider the dilatation due to mechanical blockage by the abscess, but that it was produced by ureteral paralysis from the toxemia of the abscess. They believe their contention is supported by the lumbar region pain and renal hypersensitiveness before operation.

J. THORNWELL WITHERSPOON.

The view accepted by most authors as to the origin of these tumors is that they arise from undifferentiated cells in the region of the rete ovarii, cells which have retained an unused potency to develop along male lines, so that the resulting tumors produce the male sex hormone and thus bring about their characteristic effects. It is obvious that this theory cannot be considered as proved, but it furnishes a good working basis in the study of these tumors. Other explanations which have been suggested, like that of Halban, seem to have been pretty well disproved. As I have already stated, however, this problem seems to be intimately bound up with that of sex differentiation and intersexuality, and our knowledge of both of these is still relatively meager.

In addition to the usual signs and symptoms of ovarian tumors, these neoplasms produce varying degrees of effect upon the sex characters.

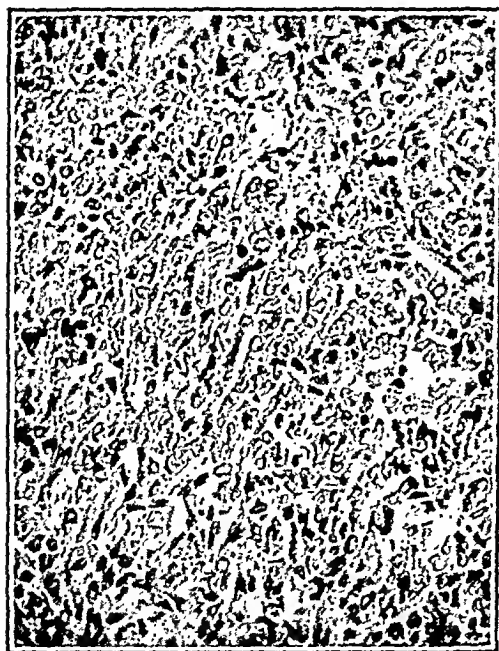


Fig. 5.



Fig. 6.

In the milder syndrome there may be only such defeminizing phenomena as amenorrhea, and decreased size of the breasts, with perhaps some loss of the subcutaneous fat which rounds off the feminine figure, so that a more angular contour is produced. Often there is in addition a greater or lesser degree of hirsutism, with a heavy growth of hair on the face, abdomen, chest, and extremities. Parenthetically, it should be emphasized that the significance of hirsutism as a masculinization phenomenon in women is anything but clear, for extensive hairy overgrowth may be observed in women who menstruate normally, who bear many children, and who otherwise are typically feminine. As this point has been more fully discussed in a recent paper by one of us (Novak), it will not be elaborated upon here.

The pathologic report is as follows: The section consisted of blood clot and degenerated decidual tissue; also a portion of endometrium showing the glandular hypertrophy usually observed in cases of pregnancy. No evidence of hydatid mole. Diagnosis: Endometrium of pregnancy.

Postoperative course was uneventful, the patient was discharged June 21, 1933, nine days after admission to the hospital, and advised to report to the gynecologic clinic.

On Nov. 18, 1933 the patient was readmitted. Her menses were normal in July, August, and September. The September period was one week overdue. Since that time patient has had slight amount of vaginal bleeding which would disappear when abed only to reappear when walking. Two days prior to her admission she began to bleed profusely. She then presented herself at the Kings County Gynecologic Clinic where she was advised to enter the hospital. Physical examination showed an obese woman markedly anemic. Lungs negative. Heart sounds rapid with a soft systolic at the apex.



Fig. 1.—Uterine curettings June 19, 1933, degenerated decidual tissue and glandular hypertrophy.

Vaginal Examination.—Marked bleeding from vagina. Cervix soft, admits one finger. Uterus and adnexa not palpated because of obesity of abdominal wall. Blood pressure 120/60. Patient was sponge-sticked and a large amount of placental tissue was removed. Following the emptying of the uterus vaginal bleeding ceased. Temperature normal, pulse 96. Patient was discharged Nov. 22, 1933 with a diagnosis of incomplete abortion.

On Nov. 27, 1933 the patient was received from the Harbor Hospital ambulance bleeding profusely from the vagina. She appeared markedly anemic with an anxious expression. Temperature 104, pulse 124, and respiration 26. Vaginal examination revealed a bluish tumor on the posterior surface of the vaginal wall just below the cervix, size of a hen's egg. A piece was removed accidentally and sent to the laboratory. Cervix soft, admitted one finger, bled moderately. Uterus irregular, enlarged to the size of two-months' pregnancy. Small piece of placenta-like tissue removed from the uterus and sent to the laboratory.

in pseudohermaphrodites and individuals with poorly developed gonads. As Meyer has pointed out, however, the intersexual manifestations in such cases are not due to the presence of the tumor, for they are present from birth, and do not disappear after removal of the tumor. In this respect there is a crucial difference between dysgerminoma and arrhenoblastoma, which likewise may be associated with intersexual manifestations. In the latter case, however, the tumor arises in individuals who previously have been quite normal, and the sex character abnormalities disappear with the removal of the tumor.

A large proportion of dysgerminomas, however, fully 35 of 64 cases tabulated by Fauvet, have occurred in individuals with presumably normal sex development. As a rule the patients are young, usually below the age of thirty, although the tumor has been noted at as late as fifty-two



Fig. 7.



Fig. 8.

years (Fauvet). The size of the tumors is very variable, and they may reach enormous size, filling most of the abdominal cavity. They are characteristically solid, though areas of degeneration and hemorrhage may be seen. The consistency is often doughy. In their earlier stages they are well circumscribed though often lobulated, but when they are large they tend to become infiltrative, invading the uterus, bladder, and other viscera.

The microscopic diagnosis is usually not difficult, for the histology is fairly stereotyped, as already stated. The constituent cells are rather large, round, or polygonal, with clear cytoplasm and large nuclei. They have a characteristic tendency to arrange themselves in alveoli and columns separated by light, or at times, substantial trabeculae of connective tissue infiltrated with lymphocytes. There is a pronounced

Tissue from tumor of posterior vaginal wall. Microscopic: The section consisted of organized blood clot within which were noted masses of Langhans' cells of varying size. These cells were palisaded or in alveolar formation. Hypertrophic types and occasional mitotic figures suggest chorionepithelioma.

On the day of admission the patient had a free hemorrhage which necessitated packing. Hemoglobin 40 per cent; R.B.C. 2,176,000; W.B.C. 6,800; polymorphonuclear 61; lymphocytes 30. Blood pressure 90/60. Sedimentation time seventy minutes. Blood chemistry, Wassermann, and urine negative. On the day after admission patient was given 500 c.c. of blood by transfusion. On December 9, R.B.C. 1,504,000, and hemoglobin 28 per cent. Patient received two more transfusions during her stay in the hospital. Roentgen ray studies of the lungs were negative for metastasis. The patient was subjected to two intensive x-ray treatments of the pelvis.

Six rabbits were injected with patient's urine in the following dilutions:

1. Injected with urine in dilution 1:20 Both ovaries show multiple hemorrhagic cysts
2. Injected with urine in dilution 1:40 Same
3. Injected with urine in dilution 1:80 Same
4. Injected with urine in dilution 1:160 One ovary shows one hemorrhagic cyst
5. Injected with urine in dilution 1:320 Same
6. Injected with urine in dilution 1:600 No hemorrhagic cysts observed

The toxic condition of the patient and the anemia gradually increased until her death on Jan. 10, 1934, six weeks after her third admission to the hospital. No postmortem was obtained.

COMMENT

1. The anterior pituitary hormone reappeared in the urine after a negative test had been obtained.

2. A quantitative relationship between the concentration of the hormone in the urine and the proliferation of the tumor mass is shown.

3. Had this case been studied by the Aschheim-Zondek test, following the expulsion of the mole, proper therapeutic measures instituted early might have checked the progress of the condition.

I wish to thank Mr. Yonke for carrying out the Friedman Test and Drs. Duncan and Rynd on whose services the case occurred.

REFERENCES

- (1) *Roessler, H.*: Ztschr. f. Geburtsh. u. Gynäk. 96: 516, 1929. (2) *Castallo, M. A.*: AM. J. OBST. & GYNEC. 26: 893, 1933. (3) *Ehrhardt, K.*: Surg. Gynec. Obst. 53: 486, 1931. (4) *Mazer, C., and Edeiken, L.*: AM. J. OBST. & GYNEC. 26: 195, 1933. (5) *Mack, H. C., and Catherwood, A. E.*: AM. J. OBST. & GYNEC. 20: 670, 1930.

1474 PRESIDENT STREET

Repetti, M.: The Vitamin A Content of Human Colostrum, *Folia gynaec.-demograph.* 31: 337, 1934.

The author's experimental studies establish the fact that the vitamin A content of colostrum is five times that of human milk. He concludes, because of that fact, it is important that the newborn be placed to the breast in the colostrum-excreting stage of lactation and makes a plea for a diet rich in vitamins during pregnancy and lactation.

MARIO A. CASTALLO.

simulation of follicles with ova. This, indeed, was the interpretation accepted by many of the older writers, as indicated by the designation "oöphoroma folliculare." Whether solid or cystic, however, there should rarely be any difficulty in distinguishing this type of tumor from the granulosa variety. The morphology of the cells is quite different, and their uniformity much more striking than in the granulosa cell carcinoma, in which one so commonly sees evidence of pronounced nuclear activity, such as mitoses. Even the cylindromatous type of granulosa cell tumor is quite different in appearance, while it is rare, if many sections are studied, not to find areas presenting the finely folliculoid, clusterlike arrangement of the granulosa cells. There are still other points of distinction, such as the one emphasized by Meyer, concerning



Fig. 9.



Fig. 10.

the characteristic centrifugal position of the nuclei of the cells surrounding the small cystic areas, as distinguished from what might be called a centripital position in the granulosa cell growth.

While the epithelial elements were formerly looked upon as the all-important features of these growths, it has been recognized within recent years that the stromal fibrosis may come to dominate the picture, with the production of fibromas of even large size. Careful study of these fibromas, however, will always reveal the telltale epithelial elements which stamp the tumor as of Brenner origin. It is this extension of the concept of Brenner tumors, as a matter of fact, that has excited the greatest recent interest, and the studies of Meyer, Frankl and others have changed our viewpoints not only on the potentialities of Brenner tumors, but also on their relation to certain other ovarian tumors.

which would rule out two major objections, namely, (1) the possibility of failure to remove all of the finer ramifications of the abdominal sympathetic chain in the rat; and (2) the possibility of new nervous connections accompanying the blood vessels.

Eighteen female white rats were used. After regular cycles were found to be present, by means of daily vaginal smear examination according to the criteria of Long and Evans,⁴ both ovaries were removed and transplanted into the antecubital



Fig. 2.—Photomicrographs of sections of ovaries transplanted into the antecubital fossa. (For description, see text.)

fossa of the right forelimb. Subsequent vaginal smear examination showed "takes" in all of the animals. Following the establishment of estrous cycles, sixteen rats were subjected to excision of the stellate ganglion on the right side. Previous dissection of normal rats showed that this procedure would effectually deprive the right forelimb of all sympathetic innervation. The operation was performed extrapleurally, through a posterior incision into the first intercostal space. The ganglion was excised, under direct observation through a binocular loupe. The method entailed a certain degree of risk, especially at first, due chiefly to the tenuousness of the pleural membrane in the rat. Of the 16 animals, 10 rats sur-

5. While in most cases the microscopic examination of granulosa cell cancer can be made from the morphology and the growth characteristics of the granulosa cells, many cases will be overlooked unless one is familiar with the many patterns produced by the connective tissue changes and by the apparent intermutability of the epithelial and connective derivatives of the progranulosa ovarian mesenchyme.

6. Arrhenoblastoma should always be suspected if an ovarian tumor is demonstrated in a woman who, though previously of normal feminine type, has exhibited symptoms of defeminization or actual masculinization.

7. Disgerminoma, on the other hand, often occurs in sexually subnormal or pseudohermaphroditic patients, though the tumor has nothing to do with the production of such manifestations, which do not regress with the removal of the tumor, as is the case with arrhenoblastoma.

8. The Brenner tumor of the pure or solid type is readily recognizable, but it must be remembered that the same histogenetic factor is concerned in the more and more frequently reported fibroma ovarii adenocysticum, as well as in at least a small proportion of serous and pseudomucinous cystadenomas.

9. The usual block or two made from ovarian tumors for pathologic study is often not sufficient for a proper evaluation of their real nature. With many tumors, such as those discussed in this paper, the study of sections from many parts of the tumor is always desirable, and often absolutely essential if a proper pathologic interpretation is to be made.

DISCUSSION

DR. JAMES E. DAVIS, ANN ARBOR, MICH.—One is inclined perhaps to disagree with Dr. Novak that these tumors are frequent and with the implication that they are easily understood and easily recognized. If one endeavors to classify the ovarian tumors by the plan that is now being accepted, many interesting difficulties will arise. This has been my experience with the collection in our museum of 275 ovarian tumors. The number belonging to this special group discussed by Dr. Novak was relatively small.

These tumors have been designated clinically the endocrine group. Their complete study takes one into genetics, cytology, ontogenetics, embryology, histopathology, and clinical pathology, so, for interpretation, one has to develop a very considerable and substantial background in order to rightly appreciate these tumors. If one follows the rule of proceeding from the general to the specific, better bearings are obtained to approach this difficult subject.

Seven granulosa cell tumors have been studied in our series of 275 ovarian new-growths obtained from a pathologic service of 12,000 surgical and autopsy cases in Wayne University's affiliated hospitals. The histopathology of these cases does not vary greatly although in one case the stroma is very abundant. The granulosa cells in the other cases vary somewhat in their assembling. In most instances single cell cords prevail with here and there a few rosette or follicle differentiations. In one case the cylindromatoid pattern is prominent. The sarcomatoid arrangement prevails in certain local fields of different sections. The best pattern of the normal granulosa cell for type comparison to the tumor form has been observed about atretic follicles.

MULTIPLE ARRHENOBLASTOMA OF THE OVARY

A. M. GNASSI, M.D., JERSEY CITY, N. J.

(From the Pathological Department, Jersey City Medical Center)

THIS case of multiple arrhenoblastoma of the ovary is reported because of the rarity of the tumor, and because, in a search of the literature, it is the only case of multiple arrhenoblastoma that I have been able to find.

Mrs. A. R., forty-three years old, white waitress, was admitted to the hospital complaining of pain in the lower right quadrant of the abdomen of seven weeks' duration. Her general health had been good except for an attack of appendicitis for which she was operated upon in 1927. Her menstrual periods started at twelve, regular, twenty-eight days, and lasted seven days. She was married in June, 1915, and had had normal marital relationships. Two months following her marriage, at the age of twenty-four, her menstrual periods suddenly ceased. In September, 1915, she consulted a physician who told her she was pregnant. The pregnancy, however, never materialized. During 1918 and 1919, she had several attacks of laryngitis and noticed that her voice gradually became huskier. Treatment for this was of no avail. At the end of 1919, she noticed a scanty growth of soft, silky hair on her face, chest, abdominal wall, and legs which became more noticeable as time passed. She treated this with depilatories and bleaches, but later she was forced to shave. During the last four years, she was compelled to shave every day.

The onset of the present illness dated seven weeks before admission with pain in the lower right quadrant which she described as "hanging and pressing and radiating to the back." This pain became increasingly severe, and a week before admission, she had to give up work because of its severity and because of the onset of vomiting. The only significant fact in the family history was that her mother died at the age of thirty-eight after an operation for a tumor, the nature of which is not known.

Physical examination revealed a masculine type of middle-aged woman, weighing 130 pounds and measuring 5 feet, 6 inches in height, lying comfortably in bed and not acutely ill. Her scalp was covered with thick, black, coarse, bobbed hair. There was a conspicuous male distribution of hair on face, neck, axillae, abdominal wall, and pubis, and the eyebrows were bushy. The voice was husky and deep, and the skin rough, thick, and dry. The breasts were small and flat, the nipples coarse and rather heavily pigmented, and the areoli studded with thick, long, dark hair. The heart and lungs were normal. The abdomen revealed no masses. The pelvis was small and masculine in type. The clitoris was hypertrophied, the prepuce prominent, the cervix small, the introitus narrow, and the uterus small with a second degree retroversion. There was a small, tender mass in the right fornix. The temperature was normal and the blood pressure was 135/80.

The report from the clinical laboratory was as follows: red blood cells 4,240,000 per c.mm.; hemoglobin 80 per cent; white blood cells 8,200 per c.mm.; differential cell count, 75 per cent polymorphonuclear neutrophils, 22 per cent lymphocytes, 3 per cent large monocytes; Wassermann negative; urinalysis, acid, specific gravity 1.015, traces of albumin, few leucocytes.

The preoperative diagnosis was cyst of the ovary; prolapse of uterus. Operation was performed Sept. 25, 1934, under spinal anesthesia. A low median line incision was made. The right ovary was smooth but lobulated, the round ligament relaxed,

SUBPHRENIC COLLECTION OF LIPIODOL FOLLOWING INJECTION INTO FALLOPIAN TUBE WITH OBSERVATIONS ON REVERSE GRAVITATION OF PELVIC EXUDATES AND THE GENITOPHRENIC SYNDROME IN WOMEN*

I. C. RUBIN, M.D., F.A.C.S., New York, N. Y.

THAT fluids in the abdominal cavity tend to gravitate into the pelvic basin has long been recognized. Fowler's position was designed to favor drainage toward the depth of the pelvis where the exudate might become localized.

The possibility that infective fluids arising from disease of the female pelvic organs may take an upward direction and reach the diaphragm has not been generally realized.

A. H. Curtis¹ described adhesions upon the anterior surface of the liver resembling "violin strings" which he believed were the result of an acute attack of gonorrheal salpingitis. According to Curtis these suprahepatic adhesions are unique. Despite careful search throughout the abdomen, no other adhesions were found by him in these cases.

Nonsuppurative subphrenic inflammation has received scant reference in the literature since Neuhof's² publication in 1912. It was followed in 1915 by Lee's contribution on subdiaphragmatic inflammation. Lee³ reported a small group of cases presenting "a syndrome of signs and roentgenographic findings of which the most plausible interpretation seems to be that an inflammatory process of unknown etiology may be situated below the diaphragm which does not go on to suppuration but which recovers spontaneously."

In Neuhof's second report (1915),² he corroborated Lee's findings and concluded that the clinical pictures described by Lee and previously by himself were identical. Neuhof gave Lee credit for calling attention to the fact that more obscure foci than a diseased appendix, gallbladder, etc., may be the source of the subphrenic infection. Fifteen years later Curtis' paper appeared in which he pointed out the etiologic connection between the adhesions on the anterior surface of the liver and gonorrhea.

The manner of extension of the infection from the pelvis to the peritoneal surface of the liver was not so clear. Curtis suggested two explanations: (1) That the infection may spread along the peritoneal surface of the ascending colon and (2) that "possibly gonorrheal disease produces a generalized peritoneal infection, beyond the confines of the pelvis more frequently than has heretofore been assumed." Hilliard Miller⁴ in his discussion mentioned two other possible channels, namely, the retroperitoneal lymph route and the portal vein.

The present paper is particularly concerned with the manner in which pelvic infection and fluids arising from the female genital or-

*Read at the Forty-Eighth Annual Meeting of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons held at Skytop, Pa., September 16 to 18, 1935.

were seen. They were well demarcated and easily shelled out. The first was round and measured 0.9 cm. by 0.9 cm. by 0.8 cm. The second, elliptical, 0.7 cm. by 0.6 cm. by 0.5 cm.; the third, oval, 0.9 cm. by 0.8 cm. by 0.1 cm., and the fourth, 0.7 cm. by 0.6 cm. by 0.5 cm.

The cut surfaces of the bodies were yellow and finely granular. The supporting tissue was firm and gray and conspicuous for the absence of corpora lutea and follicular cysts.

Microscopic Description.—The four tumors had the same histologic structure and therefore will be described together.

The tissue was stained by three different methods: with hematoxylin-eosin, with Sudan III, and with Mallory's triple stain, after washing in water and refixed with Zenker's solution.

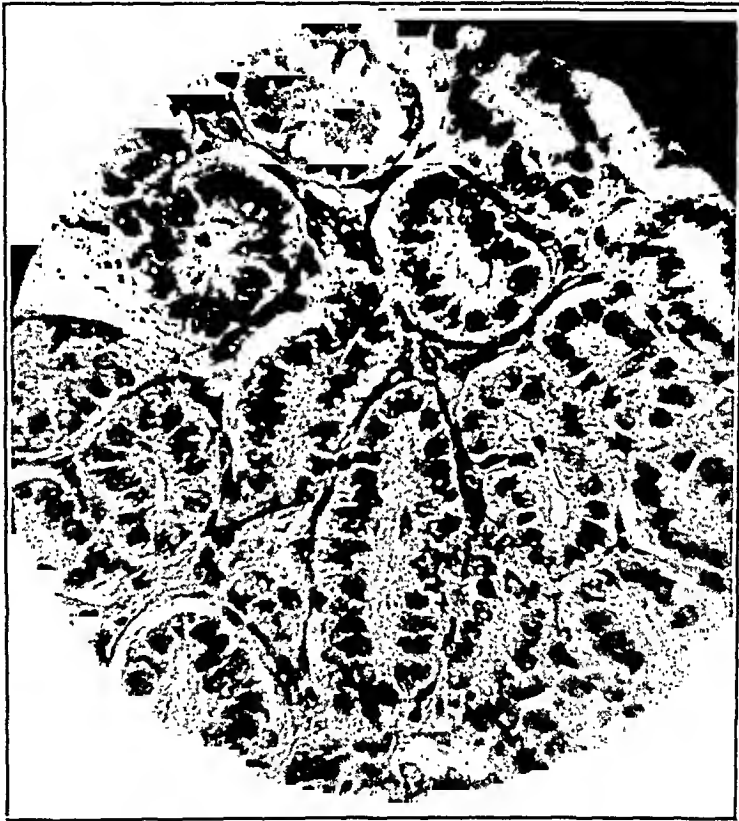


Fig. 3.—Oil immersion magnification showing closely related glandular structures resembling seminiferous tubules.

Sections showed closely related groups of convoluted, elongated, and round tubular acini lined with cuboidal or roughly spheroidal or columnar cells which had acidophilic nuclei. The nucleoli were inconspicuous, but when found were large and pale. Vacuolization of the cytoplasm, and to a lesser extent, of the nuclei was observed. The basement membrane was ill defined or absent. In places, the epithelium proliferated to partially or completely obliterate the lumen, in the latter case, leading to the formation of irregular groups or nests of cells which occasionally showed marked degenerative changes with some inflammation. In a few places, the epithelium was arranged to resemble closely the medullary cords of the gonads. In other places, there were areas of closely packed spindle-shaped cells which had hyperchromatic nuclei and occasional mitotic figures. In this region, the blood supply was scanty and the blood vessels well formed. The remaining portions of the tumor were moderately vascular. The inter- and intraluminal blood capillaries were

pointing to the presenee of an irritating process. The amount of fluid exudate poured out from the tubes in this case remains uncertain, but it would not be surprising to find a copious amount extending directly and continuously from the pelvis to the diaphragm.

Another observation in a ease of early ectopic pregnancy has thrown some light on the amount of fluid adequate to produce phrenic symptoms.

The patient was twenty-three years old and was married but three months. Her menses had been habitually delayed. A general surgeon who had seen her first, made the diagnosis of appendicitis. When I saw her the symptoms and signs of tubal pregnancy were not characteristic. However, the expulsion of a decidua gave the first clue of pregnancy which was confirmed by a positive Aschheim-Zondek test. Tenderness without a palpable mass in the right fornix suggested extrauterine pregnancy. Two attacks of mild syncope, to which the patient paid slight attention, and shoulder pains with the presence on the right side of the uterus of a small mass which developed during the observation of the patient over a period of four days, made the diagnosis certain.

At laparotomy the right tube was found swollen to the size of a thumb; there was no rupture, only a slight amount of blood having seeped through the fimbria into the pouch of Douglas, the vesicouterine space and along the lumbar gutters. The smallest amount of blood was scattered in the lower abdomen directly under the hypogastric incision.

This ease was especially instructive because it demonstrated the fact that the shoulder pains may be produced by a small amount of fluid blood under the diaphragm and that the pregnant tube need not be ruptured.

The reproduction of this symptom-complex is susceptible of demonstration in two other ways which have the force of clinical experiment. Both are methods employed in tubal diagnosis.

1. In tubal insufflation, the CO_2 gas rises to the region of the diaphragm to some extent when the patient is in the recumbent position and totally when she stands up (Fig. 1). Depending upon the amount of gas insufflated into the peritoneal cavity, the patient becomes aware of epigastric and subcostal pain while she remains upon the examining table. When the amount is small, not more than 20 to 50 c.c., only the mildest shoulder pains are produced and become evident when the patient stands up. If the volume of gas exceeds 150 c.c., epigastric and subphrenic pains are present in both postures. These symptoms are only transitory, the CO_2 gas being absorbed within a relatively short time. The pain reactions vary not only with the amount of gas but with the patient's sensitivity. A slight amount of CO_2 may provoke disproportionate pain in one patient while a much greater amount may be borne well by another. In general, however, the right subphrenic space is more sensitive.

Another significant observation occasionally made with tubal insufflation may be mentioned in this connection. I have noticed that

still more remarkable that after the tumor was removed, the menstrual cycle reappeared after almost twenty years' suppression.

I wish to thank Dr. J. M. Rector for allowing me to abstract the case and Dr. A. V. St. George for his valuable advice.

ON THE ORIGIN OF THE AMNIOTIC FLUID

WITH EXPERIMENTAL AND CLINICAL OBSERVATIONS

H. ACOSTA-SISON, M.D., MANILA, P.I.

(From the Department of Obstetrics, University of the Philippines)

THE origin of the amniotic fluid is still an object of speculation. Williams¹ mentions four theories, namely: (1) The amniotic fluid is a transudate from the blood serum, (2) it is a collection of fetal urine, (3) it is a secretion from the amnion cells, or (4) it has a mixed origin.

Zangemeister and Meissl,² Makepeace, Freemont, Smith, Dailey and Carroll;³ and Cantarow, Stuckert and Davis⁴ are of the opinion that while the amniotic fluid may primarily originate from the blood serum, it is increasingly admixed with fetal urine as the age of pregnancy advances.

Zangemeister and Meissl² reached their conclusion by noting the difference in the freezing points of the maternal blood serum and amniotic fluid, the latter being always hypotonic from the fifth month of pregnancy onward. They found that the hypotonicity of the amniotic fluid increases toward term. They found too that the fetal urine is markedly hypotonic, and they attributed the hypotonicity of the amniotic fluid to its increasing dilution with the fetal urine. In the earlier months, the hypotonicity of the amniotic fluid is much less as confirmed by Gruenbaum.⁵

Makepeace³ and his associates based their opinion on the data obtained from a comparative study of the chemical composition of 33 simultaneous samples of human blood serum and amniotic fluid. They found that the amniotic fluid has greater concentration of creatinine or creatinine-like substances, more protein, less sodium, and slightly more sodium chloride than the maternal serum. They agree with Zangemeister and Meissl² that the amniotic fluid is hypotonic and that in the earliest months, it may be isotonic with the maternal serum. They state that the amniotic fluid approaches the composition of other protein poor fluids which are in osmotic equilibrium with the blood plasma.

Cantarow⁴ and his coworkers believe the amniotic fluid cannot be a pure dialysate of maternal blood plasma. Their belief is based on the comparative study they made on human amniotic fluid and maternal blood serum obtained at the seventh to the ninth month of pregnancy and on the comparison made between the amniotic fluid and other body fluids. They determined in both the amniotic fluid and maternal blood serum, the protein, nonprotein nitrogen, uric acid, sugar, calcium, and phosphorus concentrations. They failed to find any correlation between the amniotic fluid and the blood serum. They found the amniotic fluid to have less protein, more non-protein nitrogen, much higher uric acid, less sugar, less calcium, and slightly more inorganic phosphorus. And, after comparing the chemical composition of the amniotic fluid with the cerebrospinal fluid, the peritoneal, and pleural transudates, they believe that the values obtained for the amniotic fluid would justify the theory of its being a dialysate or transudate if it were not for its high uric acid content.

2. The escape from the tubes of lipiodol is especially comparable to the discharge of serous and purulent exudates. Regarding the amount of exudate necessary to permit its passage upward from the pelvis, an accidental observation with lipiodol injection has proved most valuable.

In February, 1931, I had occasion to inject lipiodol into a fallopian tube during laparotomy. The next day a skiagraph showed an appreciable collection of the radio-



Fig. 2.—Skiagraph of patient showing left-sided subphrenic collection of lipiodol and similar shadows in the pelvis following injection into the left fallopian tube (one month after the lipiodol injection).

opaque fluid under the left diaphragm. The history of the case is as follows: The patient, S. S., twenty-six years old, was married five years. Three months after marriage, she had a nine weeks' spontaneous miscarriage followed by a curettage. Since then she has been unable to conceive. The menstrual periods were normal except for an amenorrhea of one year's duration following this curettage. Her fallopian tubes were tested elsewhere by insufflation in 1929 and 1930 and were found closed. Her husband was proved to be potent. Pelvic examination revealed

and placenta. The membranes became stained in a small patch at first, but the staining of the membranes spread rapidly into the rest of the membranes, placenta, and umbilical cord. The amniotic fluid became slightly stained. The skin of the fetus became stained in patches in those portions that came in direct contact with the membranes. The internal organs of the fetus were also stained.

CLINICAL OBSERVATIONS

Observation 1.—A case of dystocia due to fetal bladder distention caused by retention of urine as a result of absent urethra.

The patient was brought to the hospital from a near-by province with badly damaged lower extremities of a seven months' fetus dangling from the introitus. It was soon found that the cause of the unsuccessful extraction of the fetus was its enlarged abdomen. It was punctured and about 500 c.c. of clear fluid gushed out.



Fig. 1.



Fig. 2.

Fig. 1.—Fetus with hydroperitoneum and dilated bladder due to absent urethra.

Fig. 2.—The dilated bladder showing the blind ending of the sigmoid colon on its wall.

The extraction of a male fetus could thereafter be made but with some difficulty due to the still distended abdomen. Five minutes afterward an alive female child was born spontaneously, followed ten minutes afterward by the expulsion of two placentas which apparently were normal.

Examination of the stillborn baby revealed it to be a small fetus with an enormously distended abdomen. The umbilicus which occupied a circle with a diameter of 7 cm. was 21 cm. above the symphysis pubis. The peritoneal cavity was intact containing about 500 c.c. of clear fluid. It was found that what was punctured was the enormously distended bladder whose wall attachments occupied the whole pelvic cavity and lower abdominal wall. There was no urethra, no rectum, and no anus. The sigmoid ended in an attenuated blind solid cord in the left wall of the bladder (Fig. 2). The kidneys were lobulated and quadrangular in form.

The history of this patient showed that very scanty amniotic fluid was associated with the first baby.

the angulated portion of the isthmus, beyond which it did not pass. After dividing the constricting adhesions, the oil passed through. During the injection, however, the tube ruptured at one point near the divulsed fimbria causing the escape of lipiodol into the pelvis. The amount of lipiodol used was 15 c.c.

As the pelvis was packed off from the rest of the abdominal cavity by several abdominal pads, probably very little lipiodol gravitated at once toward the diaphragm. This point is especially mentioned since it may be reasonably assumed that the Trendelenburg position would otherwise favor seepage of the oil toward the subphrenic spaces. Lipiodol was used instead of air or colored fluid to demonstrate whether the left isthmus was rendered patent because it was supposed or hoped that the oil would prevent the formation of adhesions at the newly opened abdominal end of the tube.* A small amount of lipiodol was later recovered from the vagina, indicating that the oil had been forced through the strictured portion of the tube.

An x-ray film of the abdomen taken the next day revealed lipiodol shadows scattered throughout the pelvis streaking up in the region of the paracolic gutters. Both subphrenic spaces were occupied by a collection of lipiodol which was more conspicuous on the left side. One month later, the lipiodol shadows were still seen in the pelvis and under the diaphragm (Fig. 2). Incidentally, a calculus was demonstrable in the right kidney (Fig. 3). The calculus was subsequently removed. Lipiodol shadows were noted in 1934, three years after the operation. The amount of residue in the left subphrenic space was considerably diminished.

The subphrenic collection described above would have escaped detection were it not for the accidental circumstance that the technician happened to take a film of the whole abdomen and not of the pelvis alone. As the usual procedure in x-ray diagnosis of tubal patency by lipiodol or any other iodine oil injection is to take films only of the pelvis, the spread of the oil above the pelvic brim often fails to be noticed.†

Since this experience I have had the opportunity of checking the presence of lipiodol shadows above the pelvis in a number of instances after the oil was injected by others, shortly after or some months following the intrauterine injection. Lipiodol shadows were occasionally found in the region of the kidneys where they were mistaken for calculi by the roentgenologist who happened to be unfamiliar with the history of the case. In a few there were lipiodol shadows in the lumbar gutter and occasionally a small collection was seen under the diaphragm.

As the amount of lipiodol employed for salpingography is usually less than 15 c.c., in spite of which some oil finds its way to the upper abdomen, it suggests the possibility that in a similar manner a small amount of serous or purulent exudate in the pelvis may be sufficient to find its way along the abdominal gutters to the upper fossae. The extension to either side of the diaphragm is favored by the outpouring

*Whether lipiodol can prevent adhesions in diseased tubes remains problematic. From later observations the contrary appears to be true.

†This persistence of lipiodol in the subphrenic space which it reached from the pelvis served to indicate the great advantage of CO₂ gas in the diagnosis and treatment of tubal sterility, but it is not my purpose to enter into this matter here. It moreover suggested the possibility that lipiodol might be found in the abdomen above the pelvis in other cases where the tubes were patent and the amount injected was less than 15 c.c. Such indeed has actually been found to be the case.

CONCLUSIONS

The result obtained from Experiments 5, 7, and 8 in conjunction with the cited clinical observations as well as the result of the physical and chemical analysis of the amniotic fluid and the histologic examination of the amnion by independent groups of investigators justifies the conclusion that the amniotic fluid primarily originates from the placental circulation which may include that of the cord through the intervention of the amniotic epithelium, but that after the fifth month of pregnancy if not earlier, it is increasingly admixed with fetal urine.

REFERENCES

- (1) *Williams, J. W.*: Obstetrics, London, New York, 1930, D. Appleton-Century Co. (2) *Zangemeister, W., and Meissl, T.*: Munchen. med. Wehnschr. 1903. (3) *Makepeace, A. W., et al.*: Surg. Gynec. Obst. 53: 1931. (4) *Cantarow, A., Stuckert, H., and Davis, R. C.*: Surg. Gynec. Obst. 57: 1933. (5) *Gruenbaum, B.*: Deutsche med. Wehnschr. 31: 1676, 1905. (6) *Stroganoff, W.*: J. Obst. & Gynec. Brit. Emp. 41: 1934. (7) *Schmidt, H. R.*: Monatsschr. f. Geburtsh. u. Gynäk. 72: 1, 1926. (8) *Albano, G.*: Zentralbl. f. Gynäk. (Abst. J. Obst. & Gynec. Brit. Emp. 41: 1934).

Greenbaum, Katz, and Rule: Syphilis and Marriage, Am. J. Syph. & Neurol. 19: 210, 1935.

Of the 25 patients studied, 5 had acute and 20 had chronic syphilis; of the latter, some had but "serologic" syphilis, and others, discoverable macroscopic disturbances in one system or another. In not one of these, however, was a single semen study positive for *Spirocheta pallida*.

Spirocheta pallida is known to occur in the semen of a definite percentage of patients with untreated acute and chronic syphilis. This fact was generally ascertained by an examination of one specimen of semen and whereas in the present study *Spirocheta pallida* was conspicuous by its absence in all cases examined, a definite sterilizing effect of at least the neoarsphenamine and bismuth compounds upon the semen of patients with syphilis would appear to be a certainty. The value of this study lies not only in demonstrating the noninfectiousness of the semen of patients under treatment for syphilis but in indicating a method of testing syphilitic men who insist on marriage before they have had adequate therapy. It is a test of infectiousness that can be used before contemplated marriage in conjunction with the usual methods of examination.

C. O. MALAND.

Yagi, H., and Yamabe, A.: Hysterosalpingography in the New-born, Jap. J. Obst. & Gynec. 17: 412, 1934.

The authors injected iodized oil into the uteri of ten female, mature newborn babies (fresh specimens). They found that the uterine cavity and the fallopian tubes were permeable to the oil. They observed that the uterine cavity was small whereas the cervix was long. The fallopian tubes were indistinct and had many tortuosities. The pressure required to inject the contrast medium was between 200 and 250 mm. Hg. The authors conclude that hyperplasia of the uterus in an adult woman stands midway between the uterus of the newborn and the fully developed uterus of an adult woman.

J. P. GREENHILL.

pointed out, to the region of the kidneys which lie on a lower plane than the brim of the pelvis. The tubes are frequently found near the true brim of the pelvis when pus escapes from them.

Although the natural tendency for the pus is to drop into the deep pelvic basin, some of it may also find its way upward along the

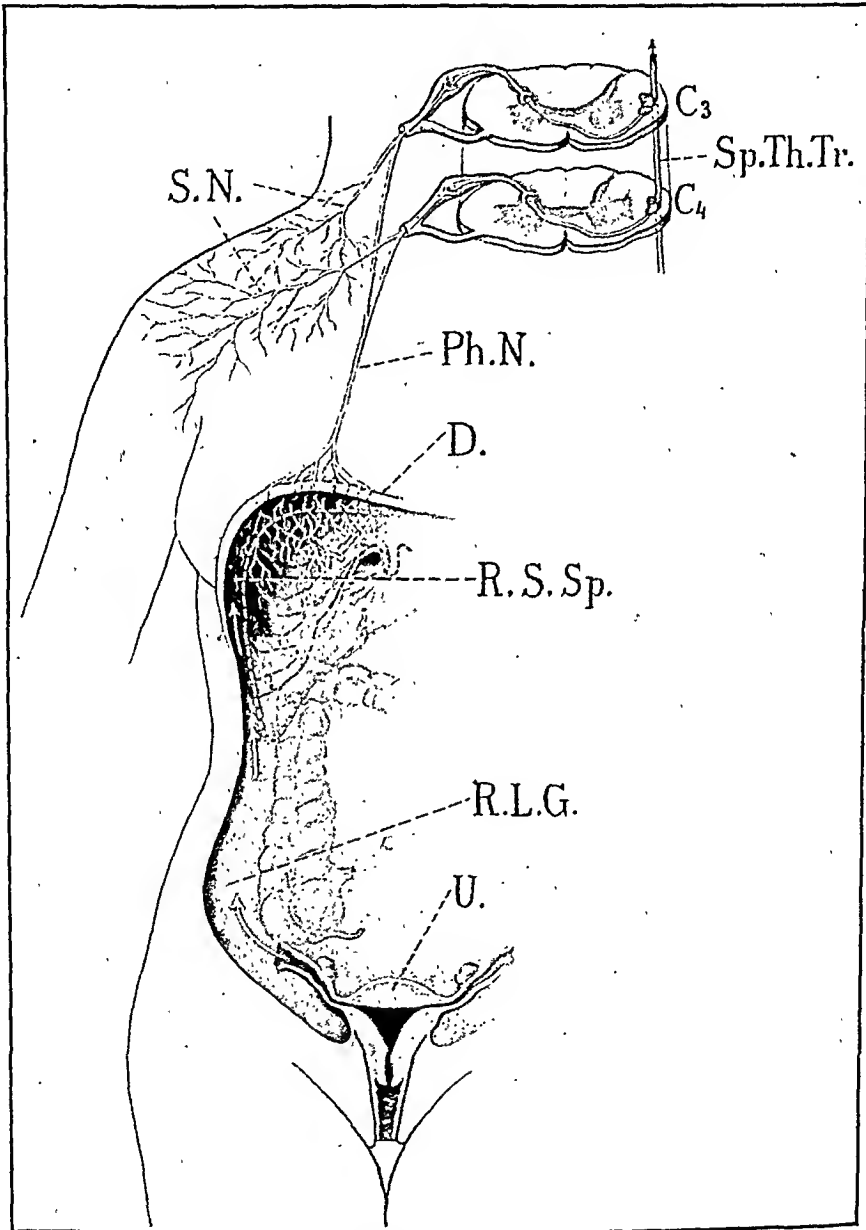


Fig. 4.—Diagram illustrating the genitophrenic syndrome in women. *C3, C4*, Third and fourth cervical segments of the spinal cord. *Sp. Th. Tr.*, Spinothalamic tract. *S. N.*, Supraclavicular Nerves. *Ph. N.*, Phrenic Nerve. *R. S. Sp.*, Right subphrenic Space. *R. L. G.*, Right lumbar (Paracolic) gutter. *U.*, Uterus.

ascending and descending colon. This is especially the case when the tubes are elevated near the brim of the pelvis. To what extent such factors as specific gravity, viscosity of the exudates, osmotic tension in the abdomen, and fluid currents influence this gravitation cannot

In her past history the only significant factor was a cardiac decompensation, now well compensated, but with fibrillating heart and a mitral stenosis. A marked ascites was present, which may have been a contributing factor by increasing the pelvic pressure.

Her immediate complaint was a discomfort when sitting or walking due to a constant protrusion of a mass from her vagina. This had been gradually getting worse since she first noticed it some eighteen months before entering the hospital.

She had been examined previously by three physicians, one making a diagnosis of rectocele the other two of prolapse of uterus. Examination in the prone position showed no evident protrusion from the vagina but after much effort at straining there was extruded the cervix and posterior vaginal wall. Fig. 1, which is an actual drawing of this condition, shows the relation of the parts. On palpation there was no cystocele, and the posterior mass seemed to be continuous beyond the cervical attachment. On rectal examination it did not seem to be rectal in origin. The cervix was somewhat enlarged and superficially eroded. A preoperative diag-

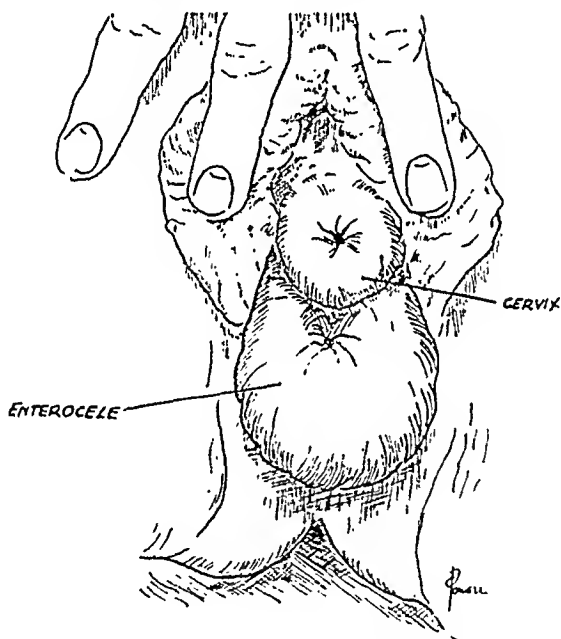


Fig. 1.—Enterocoele before operation.

nosis was made of uterine prolapse of moderate or first degree, considerable relaxation of the pelvic floor, and an associated herniation of Douglas' culdesac posteriorly.

On March 2, 1935, the operation was done under local novocaine infiltration anesthesia with absolutely no discomfort to the patient at the time of operation or afterward. The usual perineal opening for a posterior colporrhaphy was made. A dissection of the posterior vaginal wall first from the rectum, then from the anterior surface of the hernial mass using sharp dissection until above the rectovaginal attachment. The more difficult task of dissecting the rectum free from the posterior surface of the sac was then accomplished. The peritoneal sac was isolated from the surrounding fat and fascia and opened, having no contents, it was transixed as high as possible above the level of the cervix, tied off, and the excess amputated. A high purse-string stitch of the surrounding fascia was done and closed over the stump. A suture grasping the rectovaginal fascial stump on either side was passed through the posterior vaginal wall high up and tied. A high posterior colporrhaphy completed this part of the operation. A high amputation

where pain radiates from the epigastrium to the shoulders. The rest of the history and physical examination are important differential aids in identifying the true nature of the lesion and its location.

REFERENCES

- (1) *Curtis, A. H.*: J. A. M. A. 94: 1221, 1930; 99: 2101, 1932. (2) *Neuhof, Harold*: Surg. Gynec. Obst. 14: 231, 1912, and J. A. M. A., July 19, 1915. (3) *Lee, Roger*: J. A. M. A. 64: April 17, 1915. (4) *Miller, Willard*: J. A. M. A. 99: 2101, 1932. (5) *Behan*: D. Appleton & Co., 1914. (6) *Dawes, H.*: Zentralbl. f. Gynäk. No. 37, 1922. (7) *Herzfeld, B.*: Zentralbl. f. Gynäk., March 31, 1923. (8) *Rubin, I. C.*: J. A. M. A. 80: 1050, 1921. (9) *Salmon, U. J.*: AM. J. OBST. & GYNEC. 28: 241, 1934. (10) *Capps, J. A., and Colcman, G. H.*: An Experimental and Clinical Study of Pain in the Pleura, Pericardium, and Peritoneum, New York, 1932, The Macmillan Co.

MASSIVE BLOOD TRANSFUSIONS DURING ABDOMINAL OPERATIONS*

B. Z. CASHMAN, M.D., F.A.C.S., AND M. H. BAKER, M.D.
PITTSBURGH, PA.

BLOOD transfusion has been used in a great variety of medical and surgical conditions and discarded in many of them as of little or no benefit, but it has always been conceded that it is of undoubted value in cases of hemorrhage. As hemorrhage plays an important part in the production of shock, transfusion is particularly valuable to the surgeon.

After going through the evolution of the various methods of transfusions from direct suture of artery to vein to the syringe methods with 2- to 4-way valves, and also the indirect method of Lewisohn with the use of sodium citrate, it was evident that regardless of the method used, it required skill and accurate technique, with careful attention to detail, to be consistently successful in the transference of large amounts of blood. It is often desirable that transfusion be done during operation or immediately afterward, so that the surgeon finds it inconvenient to carry out the transfusion himself, especially when one is doing a number of consecutive operations. Therefore it was decided that all transfusions would be done by one of us (M. H. B.), who is not a member of the operating team and who, as a clinical pathologist, has had considerable experience in venipuncture, for the proper placing of the needles in the veins is probably the most important technical step of the transfusion, and who devised the transfusion apparatus shown in Fig. 1. By this method it is possible to transfuse a large quantity of blood, 1 c.c. at a time, so that there is a minimum of exposure of the blood to conditions outside of the vessels and clotting changes are slow to occur, and chemicals are not used. This principle of transfusing a small quantity

*Read at the Forty-Eighth Annual Meeting of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons held at Skytop, Pa., September 16 to 18, 1935.

On March 16, 1935, the operation was done under spinal novocaine anesthesia. The prolapsed urethral mucosa was cauterized radially. The same procedure was carried out in the repair of the hernia and the perineum as was done in the first case. At the end of two weeks there was a firm perineum with no protrusion on straining. A statement from her at the end of four months indicates that there has been no recurrence of her former complaints.

After a review of some sixty cases in the English literature and with this experience of being able to demonstrate the very definite entity of a herniation of the peritoneum of Douglas' culdesac through the perineal floor, it would seem that this condition might be overlooked very easily. It may also account for some of the poor results following a posterior colporrhaphy.

REFERENCES

- (1) Buerrman, W. H.: J. A. M. A. 99: 1135, 1932. (2) Black, W. T.: AM. J. OBST. & GYN. 27: 837, 1934. (3) Barker, F.: Am. J. O. Surg. 9: 177, 1876. (4) Birchenall, J.: Brit. M. J. 2: 182, 1869. (5) Chase, H. C.: Surg. Gynec. Obst. 35: 717, 1922. (6) Dew, J. H.: J. Georgia M. A. 23: 349, 1934. (7) Etheridge, J. H.: J. A. M. A. 8: 162, 1887. (8) Gratton, J. F.: Surg. Gynec. Obst. 32: 131, 1921. (9) Lothrop, H. A.: Boston M. & S. J. 168: 578, 1913. (10) Masson, J. C., and Semon, H. E.: Surg. Gynec. Obst. 47: 36, 1928. (11) Masson, J. C.: J. A. M. A. 99: 1143, 1932. (12) Miles, L. M.: Surg. Gynec. Obst. 42: 482, 1926. (13) Moschcowitz, A. F.: Am. J. M. Sc. 156: 394, 1918. (14) Sweetser, H. B.: Ann. Surg. 69: 609, 1919. (15) Taylor, J.: Lancet 1: 205, 1831. (16) Thomas, T. G.: New York M. J. 42: 705, 1885. (17) Ward, Geo. Gray: J. A. M. A. 79: 706, 1922. (18) *Idem*: Kelly, Gynecology, New York, 1928, D. Appleton-Century Co., p. 371.

620 OMAHA LOAN BUILDING

ELLIOTT TREATMENT IN PUERPERAL INFECTION

JOHN H. MOORE, M.D., F.A.C.S., GRAND FORKS, N. D.

(From the Healy, Law, Woutat, Moore Clinic)

THE treatment of an acute puerperal infection is symptomatic and supportive. It must remain so until a specific is found, which seems unlikely when all the varying factors of the infection are considered. Therefore, if any therapeutic procedure seems to have merit in the treatment of such a serious condition as an acute puerperal infection, it should be reported. For this reason, I desire to report three cases of acute puerperal infection in which Elliott treatment gave gratifying results.

All three of these patients had well-defined infections when I first saw them. The first two were classified as antepartum on admission to the hospital, and the third, a patient seen in consultation, had her infection develop within a few hours after the termination of labor.

REPORT OF CASES

CASE 1.—St. Michael's Hospital; 32915: Mrs. E. M., white, aged thirty-seven years, gravida iv, para ii. Her previous history was negative except for a spontaneous abortion at three months and an appendectomy, followed by phlebitis of the left leg.

There had been nothing abnormal in this pregnancy until the onset of the present complaint. Her estimated confinement was Aug. 17, 1934. She was admitted to the

has been called frequently to the increased danger of serious reaction after each successive transfusion. Multiple transfusions have not been discarded entirely, as will be brought out later in the paper, but they are used much less frequently than in our earlier experience.

This series consists of our last 246 transfusions which were done in 202 patients; 167 of the patients had single transfusions and 35 had multiple transfusions. The low incidence of multiple transfusions is because they were all surgical patients, that very few were transfused for prolonged infection, and chiefly because we prefer large single transfusions when possible. Most of them were transfused in preparation for operation, or during operation, as will be described later.

Of the 246 transfusions, 113 were of 600 c.c. or less and 133 were of more than 600 c.c.; 111 of these were single transfusions of 1,000 c.c. or more as follows: 38, 1,000 c.c.; 15, 1,100 c.c.; 50, 1,200 c.c.; 2, 1,300 c.c.; 4, 1,400 c.c.; and 2, 1,800 c.c.

In these 246 transfusions it was not necessary to cut down on the vein of a single donor and in only 4 instances was this necessary in the recipient. This is a tribute to the method, when one considers the large volumes of blood transfused, and that most of the patients were women, many of whom were adipose or whose veins were small normally, or in some cases were collapsed from acute anemia or shock. Seven hundred cubic centimeters was the largest amount of blood taken from a single donor, and this was done only in a few cases. In all other transfusions of more than 600 c.c. two donors were used. The only exception to this was that on two occasions, transfusion of 1,800 c.c. was made and three donors were used.

The indications for transfusion before, during, or after operation have been briefly as follows:

1. *Acute secondary anemia or shock from loss of blood as in ruptured ectopic pregnancy, hemorrhage from duodenal or gastric ulcer, etc.* In these patients, the critical condition is due to excessive loss of blood, and the urgent need of the patient is blood and not in small doses, in order to save life immediately or to make operation feasible as soon as possible. The classical type of ruptured tubal pregnancy, in which the abdomen is full of blood and there is marked pallor, weak pulse, and the typical signs and symptoms of hemorrhage, is the type of case in which massive transfusion is particularly indicated. It is our impression that it is the second 500 to 600 c.c. of the transfusion that is responsible for the most clinical improvement. The transfusion should be started at the time the incision is made. It does not seem logical, when the patient has bled from 1 to 2 liters of blood into the abdomen, that she should be given a transfusion of only 400 to 500 c.c.

2. *Chronic secondary anemia from repeated loss of blood, as in menorrhagia, metrorrhagia, bleeding hemorrhoids, etc.* When the time of operation is elective, as in fibroid tumors, and the patient shows marked anemia of long duration with hemoglobin below 50 per cent, the procedure is to give a large transfusion of 1,000 to 1,200 c.c. and then if the patient's condition warrants, the operation is done before the next expected menstrual period, thereby giving her the benefit of

abdominal distention. Healed appendectomy and cholecystectomy scars were present. The uterus was tender, two fingerbreadths below the umbilicus, and tenderness was very great over the left lower quadrant of the abdomen. The introitus was relaxed. There was moderate thin serosanguineous lochia. The cervix was well contracted and in fair repair and showed the usual early postpartum suggulations. The left parametrium was boardlike and very tender, the right, less so but it showed some involvement.

Cultures from the uterus were reported a pure culture of *Staphylococcus albus*, *pyogenes*. Blood culture, taken on admission, was negative after two weeks. The urine examination was negative and the blood Wassermann was negative. Sedimentation rate was 52 per cent the first hour.

Elliott treatment was started the evening of her admission to the hospital and she received a total of six treatments.

She received two transfusions of citrated blood, 300 c.c. each on Nov. 11 and Nov. 14, 1934. She was discharged after eleven days of hospital treatment.

The most noteworthy findings in this case were: (1) The uterine and parametrial tenderness became markedly lessened on the third day of Elliott treatment. (2) The temperature was 101.8° F. when treatment was started and never went above 100.8° F. thereafter.

On examinations Dec. 22, 1934, Feb. 13, and March 6, 1935, the patient was found to have some residual parametrial thickening on the left side, some cervical erosion, and moderate leucorrhea. The uterus was of normal size and in good position. Her menstrual periods had been reestablished and, aside from some increase in the amount of flow, were normal.

CASE 3.—Deaconess Hospital, 31861. Mrs. G. S., white, aged nineteen years, gravida i, para i, was delivered of a boy by mid-plane forceps operation by her own physician on April 1, 1935, following a labor of forty-eight hours. Her pulse varied between 100 and 126 immediately postpartum. Three hours after labor her temperature was 101.8° but it reached 104° on April 3, two days after labor.

I saw her in consultation on April 3, 1935, and found a very apprehensive patient with a dusky cyanosis, temperature 103.6° F., pulse 160, and respirations 34. Her blood pressure was 98/66. There was a suspicion of beginning consolidation at the base of the right lung. Both heart sounds were present but of poor quality. The uterus was softer than normal, three fingerbreadths below the umbilicus, and tenderness was marked over the uterus and over the left lower quadrant of the abdomen. Her tongue was dirty and dry. Smears from the uterus revealed organisms which, morphologically and with Gram's stain, resembled the pneumococcus.

Elliott treatment was started on April 4, 1935, and she received a total of ten treatments.

Her temperature reached normal on the ninth postpartum day. Her case was complicated by a well-defined pneumonia which was limited to the lower lobe of the right lung.

Several striking changes occurred in this patient following the institution of Elliott treatment: (1) The lochia, which had been scant before treatment was started, became profuse within forty-eight hours after beginning treatment. (2) Involvement progressed rapidly. (3) The temperature and pulse steadily declined.

On April 5, 1935, her sedimentation rate was 50 per cent at the end of one hour. A blood culture was not taken.

DISCUSSION

These three patients were all suffering with acute puerperal infections. They all received the usual supportive treatment of dextrose in normal saline solution by phlebotomy and Cases 1 and 2 received blood transfusions. All of them received

scheduled time for operation. The donors are usually secured from among relatives or friends or from the students of the University of Pittsburgh who have been typed and listed and are available at any time.

If it is a combined vaginal and abdominal operation, the vaginal work is completed and the field of operation on the abdomen prepared, and when the incision is being made, the transfusion preparations are carried out and transfusion started. In this way there is no interference with the operating team.

REACTIONS

In not a single instance has a chill occurred when transfusion was done during operation. If chills and temperature reactions are due to anaphylactic reactions, there is experimental evidence to account for our failure to have chills in patients transfused when under anesthesia, for it has been found by others² that acute anaphylactic shock does not usually occur in animals previously sensitized to foreign proteins, if the second dose of protein is given when the animals are anesthetized. Bronfonbrenner² found that certain anesthetics increase the antitryptic action of the blood, and he suggests that in sensitized animals the anesthetic may thus reduce temporarily the activity of the proteolytic enzyme and so slow the rate of splitting of the injected protein that acute symptoms of anaphylactic shock are averted. This experimental evidence, along with our clinical experience, would seem to indicate that the safest time to do transfusion is when the patient is under anesthesia. Of course this would not apply to hemolytic shock when bloods are wrongly matched.

In the 125 transfusions that were done when the patients were not under anesthesia, there were 8 chills or an incidence of 6.4 per cent. Of those who did not develop chills 14 per cent had a temperature reaction above 101.5° in the first seventy-two hours. These reactions are less frequent since using specially prepared salt solution for filling the transfusion apparatus before and after transferring the blood.

In the 121 transfusions done during operations a temperature rise above 101.5° in the first seventy-two hours occurred in 21 per cent. We believe that, considering the type of patient and operation in which transfusion was used, this is not more than one would expect from operation alone.

There have been no cases of hemolytic shock. We attempt to avoid serious reactions by practically never using universal donors. The donor and recipient must be in the same group, and with satisfactory cross-matching. If repeated transfusions are done, the cross-matching is repeated before each transfusion. Many of the serious reactions reported in the literature were thought to be due to the use of universal or Group IV donors, although Brines³ in a report of 4,000 cases advocates the use of universal donor. The donors are instructed to take no food

Borderline cases of anemia are typed before operation, and often a donor is in attendance during the operation ready to be used should the necessity arise for a transfusion.

The patient is safeguarded against chilling of the skin and is encouraged to relax and obtain sleep the night before operation. Operations are postponed if any signs of a cold are present. Cathartics are avoided, but the colon is unloaded by enemas. The patient is encouraged to drink a little more water than otherwise. A preliminary dose of morphine is given before the anesthesia. For many years I have used for this purpose hyoseine and morphine with gratifying results. Hyoseine is a powerful cerebral sedative and in combination with morphine, the respiratory tract is less moist, an advantage in inhalation anesthesia. Under suitable conditions avertin is frequently used.

My technic of operation of hysterectomy is very simple. The round ligaments are severed from the uterus, and the cut ends tied to insure safe hemostasis. The peritoneum of the bladder reflexion is opened up and the cervix exposed. If the ovary is to be removed the infundibulopelvic ligament is cut between clamps and tied off in mass. If the ovary is conserved the broad ligament is cut between clamps and the vessels in the uteroovarian ligament tied individually. The uterine arteries are tied with a Grad* ligature. The cervix is cut across and the canal of the cervix is carbolyzed and touched with alcohol. The stump of the cervix and operative field is carefully peritonized. All raw surfaces are covered with peritoneum. No particular attention is paid to the round ligaments, but they are used for peritonization. If the ovaries are conserved the broad ligaments are sutured to the side of the cervix. In uncomplicated cases the abdomen is closed without drainage. Plain, small-sized gut is used for the peritoneum. In stout women the fascia is closed with figure-of-eight Bauer and Black suture. In other cases the fascia is closed with a continuous mercerized silk. The skin is closed with a subcuticular stitch of silk. The silk sutures in the fascia are tied over a gauze bolster.

Tables I and II show the statistical studies of the cases of hysterectomy done by me in the five-year period.

In married patients sterility in one case of every three. Lowest hemoglobin was 35 per cent, highest 110.5 per cent. Blood transfusion, when necessary, in 18 cases, 7.3 per cent. The highest systolic blood pressure was 190, the lowest 80. Albumin was found in the urine of 71 cases, 28.9 per cent. Menstruation was regular in 154 cases, 62.6 per cent; irregular in 83 cases, 33.7 per cent, and ceased in 9 cases, 3.7 per cent.

There were complete hysterectomies in 51 cases, 20.8 per cent, supravaginal hysterectomies in 195 cases, 79.2 per cent.

There were four deaths, a mortality of 1.6 per cent. Of the 180 private cases there were two deaths, 1.1 per cent, of the 66 ward cases two deaths, 3.3 per cent.

*NOTE: This method of ligation is described in *Am. J. Obst.* 79: 379, 1919.

MORTALITY

Of the 121 patients transfused during operation there were 17 deaths. While this is a high mortality, it must be remembered that this series includes our worst cases, the aged, the obese, and those with prolonged jaundice. Eleven of 17 who died had malignant disease. Seven of these deaths occurred from one week to two and one-half months after operation, and death could not in any way be attributed to transfusion. Ten patients died within the first week after operation as is shown in the case reports. In none of these do we feel that transfusion was responsible, for they were all very ill patients in whom death was a very likely outcome following operation. In the jaundiced patients who died within twenty-four hours, there may be some justifiable doubt as to whether transfusion was responsible. There was no evidence of hemolysis or urinary suppression in any of these cases, however.

We have no apology to make for the risks that were assumed in this series. In the 11 patients with malignant disease and in 2 patients with prolonged jaundice without malignant disease, death was certain without operation. Among the patients who recovered were some in whom the risks seemed just as great, but who were salvaged by operation, for example, as in the following case:

A thin, pale, undernourished woman, aged forty-three years and weighing 90 pounds, was admitted, complaining of enlargement of the abdomen and loss of weight. Examination revealed a fixed mass filling the pelvis up to the umbilicus. The appearance of the patient, the rapid growth and the fixation of the mass made us feel that she had a malignant cyst of the ovary. An attempt at removal was advised. The mass was found to be a solid tumor of the ovary, adherent by recent inflammatory adhesions with no evidence of gross extension of the tumor. Separation of the adhesions was accompanied by profuse bleeding so that before transfusion was started, the pulse was becoming more rapid and weak. One thousand two hundred cubic centimeters of blood were given with marked improvement in pulse rate and volume. The tumor was removed, and the patient left the table in a satisfactory condition. Exploration of the upper abdomen revealed a large, freely movable carcinoma in the hepatic flexure of the colon. No metastases were felt in the liver. There had been no symptoms of obstruction, and aside from slight cramps and some looseness of the bowels, there were no symptoms of involvement of intestine. The patient made a good recovery, and three weeks later the right half of the colon was resected and ileocolostomy was done. Again the patient was given 1,200 c.c. of blood during operation. Three days after this operation, the hemoglobin was 82 per cent as compared with hemoglobin of 60 per cent on admission. Three weeks after the second operation, patient was walking about and was allowed to go home.

Our impression was that we had to deal with a primary carcinoma of the hepatic flexure with secondary growth in the ovary much larger than the primary growth. It was thought that this would prove to be a Krukenberg tumor, but the sections do not show the typical characteristics of a Krukenberg tumor and the histologic pictures of the two tumors are so different that our pathologist, Dr. Bruecken, feels that they may be independent primary growths. The growth in the colon is a colloid adenocarcinoma, while that in the ovary is a solid tumor with no glandular arrangement and no manifestation of colloid or mucous secretion or formation.

A PROTECTIVE SHIELD FOR PROLAPSED CORD

PRELIMINARY REPORT

WILLIAM F. MENGERT, M.D., IOWA CITY, IOWA

(From the Department of Obstetrics and Gynecology, State University of Iowa)

TREATMENT of prolapse of the umbilical cord through the incompletely dilated cervix is unsatisfactory because fetal mortality remains high. Attempts at reposition of the cord generally are futile since it has a continued tendency to prolapse. However, if the prolapsed loop is wrapped in mercurochrome-saturated gauze before reposition, there is less likelihood of recurrence. The insertion of a Voorhees' bag following such attempts at reposition introduces a grave danger of compressing the cord between bag and cervix. Most obstetricians feel that manual dilatation of the cervix with its inevitable lacerations is too radical a method of therapy under such circumstances, while the use of cesarean section, in view of the notoriously poor fetal risk, is seldom justifiable.

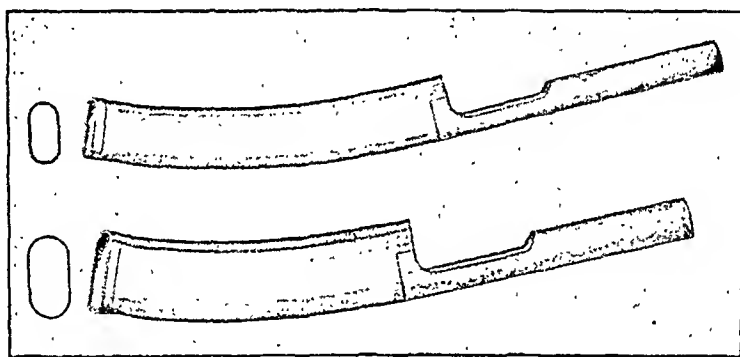


Fig. 1.—Drawing of shields of each size showing shape of cross-section of the tube. The smaller size is $1\frac{1}{2}$ by 3 and the larger 2 by 4 cm. The lengths of the tubes are 17 and 19 cm. and of the handles, 14 cm.

Some device which can protect the prolapsed loop of cord from compression during the first stage of labor without injuring maternal tissues, suggests itself.

A shield has been devised to achieve this purpose. (Fig. 1.) It is essentially a flattened, metal tube, with a pelvic curve and a handle to facilitate manipulation. The lumen must be large enough to admit both branches of the prolapsed loop. In cross-section the tube is rectangular with rounded ends. Shields were made in two sizes, $1\frac{1}{2}$ by 3 and 2 by 4 cm. in cross-section, and in two lengths, 17 and 19 cm. (Fig. 2).

In use (Fig. 2, A, B, and C), a suitable length of umbilical tape is threaded through the shield, through the loop of prolapsed cord, and back through the shield (Fig. 2, B). Gentle traction insinuates the loop of cord into the shield as it is passed up and through the cervix. The shield remains in position until the cervix becomes fully dilated, at which time delivery may be accomplished. If necessary, a Voorhees' bag may be inserted beside the shield to provide a dilating wedge (Fig. 2, C).

CASE 5.—Patient, aged twenty-four years, had occlusion of common duct due to injury at operation and was pregnant (two and one-half months). Operation: Anastomosis of bile sac to stomach. Transfusion, 1,200 c.c. Patient was jaundiced since the day after a cholecystectomy ten months beforehand. She was vomiting for four days before admission. Coagulation and bleeding time were prolonged, and the stools contained no bile. Calcium was given intravenously for three days before operation, and patient had the usual preoperative preparation with glucose solution. A large walled-off collection of bile was found in the usual location of the common duct and was evidently the result of complete severance of the duct at operation, and later absorption of the ligature. Ends of the duct were not found. An effort was made to connect the bile cavity and stomach by means of a T-tube. Patient aborted twelve hours after operation and died five hours later. No evidence of hemorrhage.

CASE 6.—Patient, aged seventy-four years, had carcinoma of the hepatic flexure of colon, intermittent attacks of intestinal obstruction, and chronic bronchitis. Operation: Resection of terminal ileum, ascending colon, and one-half of transverse colon, ileocolostomy, Mikulicz. Transfusion during operation, 1,200 c.c. Patient died of pneumonia six days after operation. No evidence of peritonitis.

CASE 7.—Patient, aged thirty-nine years, had metastatic carcinoma of liver and periductal lymph nodes with obstruction of common duct and marked distention of gallbladder. Operation: Cholecystogastrostomy. Transfusion, 1,200 c.c. Radical amputation of breast for carcinoma four years before. Five weeks before admission patient had pain in epigastrium and back, and two weeks later she noticed the presence of jaundice. Exploratory laparotomy was advised. Coagulation time and bleeding time were prolonged, and calcium was given intravenously for three days before operation, and glucose was administered. Patient died twenty-four hours after operation. Autopsy revealed carcinoma in liver, lymph nodes, along common duct, and in the ovaries. No hemorrhage.

CASE 8.—Patient, aged thirty-five years, had chronic metritis and chronic salpingitis. Operation: Bilateral salpingectomy and supravaginal hysterectomy. Cervix had been cauterized at a previous operation. Transfusion, 1,200 c.c. Patient was obese, dyspneic, and had excessive menstrual flow. Hemoglobin, 55 per cent. She was kept in bed for two months before operation. Pulse remained rapid throughout postoperative period, and patient died seven days after operation of circulatory failure. No evidence of peritonitis.

CASE 9.—Patient, aged twenty-five years, had puerperal infection and suppurative thrombophlebitis of left ovarian vein, and inferior vena cava. Operation: Exploratory laparotomy. Transfusion during operation, 250 c.c. Patient was delivered of one of twins at home. Was sent to hospital fourteen hours later for delivery of the other of the twins. She developed puerperal infection with chills and fluctuations of temperature from normal to 106°, as is seen in thrombophlebitis. This continued for one month with no evidence of improvement in spite of blood transfusions, etc. She then developed an enlarged very tender liver with right diaphragm pushed high. With the idea that patient probably had a liver abscess, exploration was done. Patient was pale and thin, with hemoglobin of 50 per cent. Liver was much enlarged but no abscess found. Left ovarian vein was thrombosed up to the renal vein. During this exploration and while the patient was being transfused, she died suddenly. Autopsy revealed suppurative thrombophlebitis of left ovarian vein, left renal vein and inferior vena cava to above the diaphragm. A large pulmonary embolus was the cause of death. Embolic abscesses were found in lungs and spleen. The very tender greatly enlarged liver led us to believe that drainage of an abscess might change the course of this illness, but autopsy revealed a hopeless condition.

When the prolapsed cord was moistened with warm sterile water, its diameter immediately increased 50 per cent and pulsations became stronger. Consequently, the exposed cord was packed in gauze and moistened with repeated applications of hot, sterile, normal saline.

Under light ethylene anesthesia a Voorhees' bag was inserted and filled with sterile water without affecting cord pulsations. A medium size was chosen because it was feared that a larger one might overlap the uterine end of the shield and pinch the cord. The bag was expelled at 12:35 P.M. and was replaced immediately with the largest size available.

At this time, cord pulsations were weak. Two minims of epinephrine were injected into the umbilical vein, but there was no appreciable change in fetal heart rate or strength. The needle caused moderate bleeding which was controlled by slight pressure with the moist pack around the cord.

The second bag, not quite fully distended, was expelled at 1:05 P.M. The patient was immediately anesthetized, draped, given 0.5 c.c. of epinephrine intramuscularly, and breech extraction was begun. This proceeded easily until the head met the incompletely dilated cervix, which was incised about 1 cm. in two places.

The child, which was extracted at 1:10 P.M., was limp and pale, but was revived by tubbing in warm water and by carbon dioxide-oxygen supplied through an intra-tracheal catheter. It soon breathed independently though rapidly, and obviously was suffering from intracranial hemorrhage. Twenty cubic centimeters of maternal blood were injected under the skin of the back. The baby, a male weighing 2,085 gm., died at 5:30 P.M., four hours and twenty minutes after birth. Autopsy revealed a tear of the left tentorium and cerebellar hemorrhage. No evidences of asphyxia were noted. The cord measured 74 cm. in length.

DISCUSSION

The prompt appearance of visible pulsations in a hitherto pulseless, prolapsed cord, following introduction of the protective shield, indicates that pressure was removed from the cord by the instrument. As a corollary it also appears that absence of pulsations in a prolapsed loop should not deter one from using the shield.

The observed change in diameter of the pulsating, prolapsed cord when moisture and heat were applied is of considerable interest. Inasmuch as the cord was pulsating before, during and after this alteration in diameter, the change was probably due to some vasomotor phenomenon in the cord rather than to alteration in force of the fetal heartbeat. It would seem that maintenance of proper thermic and hygroscopic conditions of the prolapsed portion of the cord is an important part of the therapy.

As experience and knowledge in the use of the shield develop, the injection of epinephrine into the fetal circulation may prove of value. However, it will be used with caution in subsequent cases. The use of alpha-lobelin, a respiratory stimulant, is of course contraindicated until after birth of the child.

The second Voorhees' bag was insufficiently expanded and did not produce full cervical dilatation, which factor surely contributed to the intracranial hemorrhage in the baby. There is, however, no evidence that the presence of the shield interfered with complete distention of the bag.

Despite the fact that the cord protruded through the vulva for one hour and forty minutes, and that the cervix was filled with a Voorhees' bag for one hour of this time, the baby was born alive and breathed spontaneously for four hours. Its death, as proved by autopsy, was due to intracranial hemorrhage with prematurity and breech presentation predisposing factors.

given. Following this the temperature gradually came to normal so that one month later, laparotomy was done and the large uterus was found to be free except on left side where there was direct extension of the growth through broad ligament to abdominal wall and was found to be inoperable. Cervix was dilated and radium was inserted into uterine cavity. Bleeding stopped, but patient died two and one-half months after operation. No autopsy was permitted.

CASE 7.—Patient, aged fifty-nine years, had a carcinoma of the breast. Operation: Radical operation for carcinoma of breast. Transfusion, 1,200 c.c. Patient was a large, very stout woman. She made a good postoperative recovery, with normal temperature after the first two days. Seven days after operation, she had successive attacks of sharp pain in the left chest, in the left upper abdomen in the region of the spleen, and in the left calf of the leg, evidently due to emboli. She was then as well as usual for twenty-four hours when there was sudden severe pain in the precordium with collapse and death in one hour, apparently from a coronary embolus.

CONCLUSIONS

From our clinical experience, the following impressions have been gained:

1. Massive blood transfusion is a most valuable treatment of acute hemorrhage or early shock.
2. Blood transfusion during operation is one of the best measures for preventing exhaustion or shock.
3. Patients with hemoglobin of 70 per cent or less are handicapped patients and it is questionable whether we are justified in subjecting them to elective severe surgical procedures without transfusions.
4. Blood transfusion is a measure that aids in making poor operative risks safely operable.
5. With compatible bloods, a large transfusion is probably as safe as a small one, and safer than multiple small transfusions. Perhaps this may not be true in the presence of severe infections.
6. For the prevention of unfavorable reactions, it is an advantage to have transfusions done by one individual equipped with a method for the uniformly successful transfusion of large quantities of blood without cutting down on the veins, without the use of chemicals, and with a minimum of exposure of the blood to conditions outside of the vessels. In order that transfusions may be done during the operation, this individual should not be a member of the operating team.
7. Although multiple donors are used, unfavorable reactions are rare if the following precautions are carried out: (a) The use of donors of the same group as the recipient whose bloods have been directly cross-matched with that of the recipient. (b) The donors should not take food for 12 hours before a scheduled transfusion. (c) That there be no technical errors or delays in the transference of the blood.
8. Transfusions with the recipient under anesthesia seem to eliminate chills and lessen the incidence of temperature reactions.

obtained by insertion throughout the length of the sponge of a rigid stethoscope tube. On removal of the sponge after eight or ten days, most of the epithelium remained in place and formed a suitable flexible epithelial lining for the vagina. Dilators are employed during the first few weeks to aid in avoiding contraction in the diameter of the canal and through them one can see easily how any granulating areas are progressing.

We have found, as have others, that conscientious and frequent dilatation for the first two months postoperative is a very essential factor in obtaining the desired results. Where the patient is married, the matter is taken care of satisfactorily. In several of those mentioned, proper after-care was not possible.

Mechanical difficulty in removing the grafts has been found by many operators and in the more recent cases, many have used a special knife devised by Schepelmann which cuts a wide strip of tissue more easily than the ordinary skin graft knife. Another aid is to stretch the skin more taut on the thigh with a metal spreader or by sewing blocks of wood to the skin and using them for counter traction at either end of the area, from which the grafts are to be removed.

The advantages of this type of operation, as we see it, are (1) no risk of life or serious morbidity, (2) no bad scars left on the skin as in lifting up thick flaps, (3) no prolonged hospitalization, (4) vaginalization of the lining of the canal, (5) no irritating discharges, and (6) simplicity of technic.

CASE 1.—E. B., aged nineteen, with a history of lack of menstruation. Occasional attacks of lower abdominal pain of dull character about two days every month. Apparently a normally developed female, hair and breast tissue and female contour not noticeably deficient. Vagina absent, vulva of normal appearance. Pressure with the finger below urethra allowed invagination of the tissues for a distance of 2.5 cm. Laparotomy revealed two normal tubes and ovaries, the inner ends of the tube being attached to the inner ends of the normal round ligaments at the top of the bladder at points about 7 cm. apart. At these junctions, sections were removed from the rounded ends which showed muscular tissue of uterine type. As these two points were elevated, and the posterior bladder wall was made taut, a linear "Y"-shaped thickening extended down in the direction of the vulva. The culdesac of Douglas appeared normal posteriorly, but continued forward to the bladder.

A "U" flap was dissected free from the inner side of the left thigh as the first stage of a Frank operation. After a few days, necrosis of the peripheral 7 cm. caused us to change our plans, and a Kirschner-Wagner operation was performed with the aid of Dr. R. P. Wadhams, who cut the skin grafts, using a rubber sponge prosthesis 4 cm. in diameter and 10 cm. in length without a central drainage tube. Dissection of the cavity could not be extended deeper than 8 cm. as the peritoneum of the extended culdesac was reached. Skin grafts were fastened to the sponge with No. 0 plain interrupted sutures and four silkworm-gut sutures were employed to hold it in place. These were removed on the eleventh day as was the sponge. Considerable discharge escaped during the last three or four days which seemed to have been dammed up behind the sponge. Patient was up and around the ward on the fourteenth day, dilatation having been started by that time. On leaving the

c.e., including The Presbyterian Medical Center, Charity Hospital in New Orleans, and others as indicated by informal reports. For chronic sepsis, slow convalescence from infection, long postoperative courses, and similar depletions of blood quality, we have found the small, repeated, so-called medical transfusion very useful.

DR. JAMES E. SADIHER, Poughkeepsie, N. Y.—As the technic of blood transfusion has become simpler and simpler, some of us starting with 500 c.c. at each transfusion have gradually increased the amount, but I have never used the massive amounts indicated by the essayist. About 600 or 700 c.c., perhaps a little more, has been relatively frequent in my practice, and I have not noticed that there was any greater reaction in those cases having the larger transfusions than in those with the smaller ones.

I am in accord with Dr. Cashman as to the danger of multiple small transfusions, except where this has to be used in children, and I feel that if we are going to use this excellent therapeutic measure we should certainly use an amount sufficient to do some good. I am not in accord, however, in respect to the universal donor. I have frequently used the universal donor and do not recall that we have had any greater number of reactions. Perhaps I have not watched that closely enough.

DR. F. S. WETHERELL, SYRACUSE, N. Y.—Dr. Cashman brought out one important point I should like to speak of. Some years ago we did have frequent chill reactions following transfusion, and it occurred to me that perhaps we were using the donors too soon after they had eaten. With Dr. Parker, my assistant who gives most of the transfusions, we decided to have these patients go without food for at least six hours. We thought that perhaps the blood saturated with the proteins of the meal might be giving the reaction. I have not seen that mentioned in the literature. Since then our patients have been practically free from reactions despite the fact that we use the citrate method.

I feel that Dr. Cashman has given us something of great value, to realize that a patient will take that much blood, and surely the blood does stay in the vessels. Any solution is rapidly eliminated from the vascular system, but the blood remains there.

DR. CASHMAN (closing).—There have been objections to the universal donors and we do not use them for we have tried to use all the precautions possible, particularly in these massive transfusions. The same is true with regard to food. Whether it plays a part in the reactions we do not know, but it may do so. The reason that we specify twelve hours is that we operate in the morning and have the donors take no breakfast.

Referring to Dr. Gordon's paper yesterday on ectopic gestation, Dr. Calkins said that often if a surgeon gives a transfusion he thinks that he has done his part, whereas he should continue giving transfusions until the patient is in good condition. This morning in discussing premature separation of the placenta, Dr. Bill warned against waiting until after delivery to give the transfusion. He advocated giving it before or during delivery, and that is our opinion exactly. In addition, we are advocating in elective surgery transfusion on the operating table for patients who are handicapped and on whom we are anticipating a severe operation with, perhaps, much loss of blood.

ARACHNOIDISM IN PREGNANCY

JOSEPH J. HILTON, M.D., LOS ANGELES, CALIF.

MRS. P., para ii, aged twenty-four years, first presented herself for examination on March 25, 1934. Weight 122 pounds and height 63 inches. Blood pressure 115/80. Urine and blood count were normal. Wassermann was negative. Heart and lungs were normal. There were two scars on the abdomen, one in the median line about 8 cm. in length and the other over McBurney's point about 5 cm. in length. The uterus was slightly above the umbilicus and seemed normal in size and shape for the time of her pregnancy. The perineum was relaxed, due to the presence of an old tear from a previous delivery. There was moderate degree of cystocele and rectocele. The cervix showed an old transverse scar with a slight degree of endocervicitis. Pelvic measurements were: interspinous 26 cm., intereristous 28 cm., intertrochanteric 31 cm., external conjugate 20 cm. Outlet: anteroposterior 11 cm., transverse 10.5 cm., posterior sagittal 7.5 cm. Height of sacrum 11 cm.

Past History.—Appendectomy for acute appendicitis in 1921. Tubal pregnancy involving the left tube at seven weeks in 1931. No serious illnesses or history of allergy.

Obstetric History.—Normal delivery on Jan. 10, 1927, full-term, male child, weighing 8.5 pounds. Two miscarriages subsequently, both induced at the second and third months, with no apparent sequelae.

Menstrual History.—First period at thirteen years, every twenty-eight days, moderate flow, with no pain. Some premenstrual irritability with moderately severe headaches the first day. Her last period was Aug. 8, 1933.

Prenatal Course.—The patient was seen at two-week intervals, and on April 25, 1934, her weight was 128 pounds, blood pressure 100/60, urine negative. The fetus was in L.O.A. position; fetal heart tones in the left lower quadrant, rate 136. Moderate degree of diastasis recti.

Present Attack.—On April 28, 1934, at 3:00 P.M. there was a sudden onset of violent vomiting and retching. Severe abdominal pain was accompanied with chills and marked weakness. The vomiting was incessant, at first consisting of stomach contents; later it was mixed with blood and the last was 25 c.c. of pure blood. There was severe pain in the epigastrium and three loose bowel movements. She was seen by me at 8:30 P.M. Her face was ashen, and she presented the appearance of moderate shock. Pulse 140, temperature 96° F., respirations 30, blood pressure 100/50. At this time the vomitus consisted of blood-stained fluid. There were severe abdominal pain and generalized rigidity situated for the most part in the epigastric region. There was tenderness in a small area over the fundus which seemed to be occupied by a fibroid 3 cm. in diameter. The uterus was tetanic, not extremely hard, and about the size of an eight months' pregnancy. Fetal heart tones were in the right lower quadrant, rate 144.

A premature separation of the placenta was suspected, and she was sent immediately to the Hollywood Hospital by ambulance for observation. On her arrival at the hospital she was vomiting, the uterus was tetanic, and the abdominal pain was severe. A blood count showed red blood cells 3,800,000, hemoglobin 76 per cent, white blood cells 33,500, polymorphonuclears 90 per cent, lymphocytes 10 per cent, Schilling, segs. 70 per cent, stabs 18 per cent, juveniles 2 per cent.

the weight of the newborn; second, what effect it has upon the occurrence of stillbirth; and third, what conditions gave rise to a diagnosis of fibrosis if such is not a pathologic entity.

Among the record of 700 placentas which were examined grossly and microscopically, I found 101 in which mention was made of increase in density of the connective tissue of the villous stroma, and 54 in which the deposit of fibrous tissue around the fetal vessels of the placenta appeared heavier than normal. To these respective appearances the terms "diffuse fibrosis of the placental villi" and "perivascular fibrosis" were applied. In many instances the two types of "lesion" were found coexistent in the same placenta.

In the 101 instances of "diffuse fibrosis" there were, of infants born at or near full term, 86 reported weights, of which the average was precisely 7 pounds. In the 54 instances of perivascular fibrosis, there were 48 reported weights of infants born at or near full term; the average of these was 7 pounds 2 ounces. These average weights are well within normal for ward charity patients, 50 per cent of whom are colored.

In the first group of 101 patients there were 5 stillbirths: 2 due to toxemia; 1, to syphilis; 1, to embryotomy; and 1, to monstrosity. In the second group of 54 patients there were 6 stillbirths: 3 the result of syphilis; 2, of toxemia; and 1, of embryotomy.

I approach the problem of why the diagnosis of fibrosis was made originally in these numerous instances with considerable temerity, for when one goes back in the light of new-formed opinion to reexamine or correct a previously formed judgment, he is in almost as great danger of undertaking his task in a prejudiced manner as he was of committing error in the original work. Nevertheless, as the conclusion of increasing experience, I am certain that there were certain pitfalls into which I fell, and into which others may also. Perhaps anxiety to detect too minute lesions in the organ that one is studying and too great willingness to accept the interpretations which have been handed down through generations of textbooks, account for some of the error. Whatever may have been the reason, a review of this entire problem convinces me that within the normal life span of the placenta, true fibrotic lesions do not develop.

That the amount of connective tissue varies between different specimens and between different histologic sections is apparently true. Several conditions account for such variation. In the first place, between different subjects, the histologic architecture of the full-term placenta differs with some degree of latitude, one specimen revealing upon microscopic study a delicately constructed system of villi and capillaries, another a more rugged stroma, while both are adequate for the needs of the fetus in utero. Then again the histologic archi-

ACROPARESTHESIA

MAX M. GOLDBERG, M.D., NEW ORLEANS, LA.

(From the Department of Medicine, Touro Infirmary)

ACROPARESTHESIA is a very common symptom during the climacteric period. In fact, Borak¹ claims that it is a constant symptom of this period. A great number of women suffer slightly with this symptom during the menopause and pay little attention to it, while in a few patients it assumes major proportions as a presenting symptom and causes the patient to seek relief.

The literature regarding this syndrome is barren. There have not been a dozen papers written concerning it in the past twenty years.

Wechsler² describes acroparesthesia as "an ill-defined syndrome which occurs mainly in women at about the climacterium, though artificial menopause is also capable of giving rise to it. Precipitating factors, such as infections, pregnancy, exertion and exposure to cold are predicated on quite fortuitous grounds. The symptoms are mainly subjective in nature and consist of various dysesthesias. The patient complains of numbness and coldness of the extremities, especially of the finger tips, of tingling and crawling sensations. Pains are occasionally present. The hands are stiff and need limbering up. The condition is practically constant, but considerably worse at night and toward morning. There are no objective signs as a rule. Occasionally one observes pallor of the fingers and slight diminution of sensation."

"Acroparesthesia has been divided into two groups by Strauss and Gutman: one, a vasoneurosis occurring between the ages of twenty and forty, characterized, in addition by cyanosis, blanching, or edema of the fingers; the other, occurring at the menopause, and resembling tetany, with exaggerated electric and mechanical irritability of nerves, but without vasomotor symptoms. The clinical picture develops gradually, runs a chronic course for years, and ultimately disappears."

No attempts to treat the acroparesthesias endocrinologically have been recorded either in the textbooks or in the literature. In view of the evident close association of the syndrome with the menopause, it was felt that an attempt to treat these symptoms with the estrogenic hormone would be indicated. Other menopausal symptoms were studied in conjunction.

The estrogenic hormone (theelin, Parke, Davis and Company) was used in doses of 300 rat units injected subcutaneously once a week. This dosage will usually bring symptomatic relief to the average patient suffering from menopausal symptoms. In two patients other substances, as indicated, were used.

Twenty cases form the basis for this report. Two patients were treated with theominal (Winthrop) tablets, one tablet after each meal. Both patients obtained almost complete relief from the acroparesthesia and also the vasomotor flushes, and are included to indicate that substances other than hormones may be successfully used to counteract the symptoms.

Of the eighteen remaining patients who received theelin, sixteen were greatly relieved of both the vasomotor flushes and acroparesthesia within two to four weeks after the institution of treatment. In no case was the acroparesthesia completely controlled, a slight amount persisting. In four cases the acroparesthesia had been so severe as to awaken the patients once or twice during the night. All four of these patients were able to sleep through the night and awaken in the morning with only slight symptoms, following the use of the hormone.

tion reveals a diffuse fibrosis of the villi, a diminution of the capillary bed, and perivascular thickening of the vessels, that silver staining reveals the presence of spirochetes. It has been affirmed that a diagnosis of syphilis can be made upon the basis of these several criteria.

From time to time a question has been raised as to the infallibility of these criteria. In one of his recent publications McCord⁷ presents the following observation: "Increasing experience has caused me to form gradually the opinion that the histologic diagnosis of syphilis of the placenta is laden with many difficulties, and to question its practical value as a routine method of determining syphilitic infection." He then adds the significant statement, "the more premature the placenta, the more difficult it is to make a diagnosis of syphilis."

In a microscopic comparison of the albuminuric, the syphilitic, and the normal placenta Mare Riviére¹¹ finds that certain supposedly characteristic lesions are present with such frequency in each of the types that no basis of differentiation can be established.

On the other hand, T. E. Olin¹⁰ after describing certain well-recognized lesions, such as villous hyperplasia (of the stroma cells), leucocytic infiltration, and zonal necrosis of Wharton's jelly in the cord, states: "Since all the above mentioned alterations can occur also without lues, it is impossible always to make a diagnosis on the basis of these alone. Still they are sufficiently definite to make the case suspicious, and when one encounters in the afterbirth side by side a typical villous hyperplasia, so-called miliary abscesses and changes of extensive grade in the fetal cord, one may attribute it with seeming certainty to lues." And Ciulla³ in a recent x-ray study of the arterial vascularization of the placenta affirms that from his plates he can differentiate the normal, the syphilitic, the albuminuric, and the eclamptic placenta.

One may ask why this confusion and difference of opinion exists concerning syphilis of the placenta. The answer lies, I believe, in the fact that the changes recorded are not true syphilitic lesions. Alterations in structure which have been accepted as characteristic of syphilis may also be found in the placenta of other types of premature stillbirth.

For instance, there are no lesions of the placenta which are comparable to those found in the adult organism or even in congenital syphilis of the child. The finding of spirochetes in the placenta is a rarity, while in the tissues of the baby they are quite common. I personally have pored over slides of the placenta stained with the Levaditi or the Warthin technic for hours at a time with the ever waning hope of finding a single spirochete, and I have yet to see in the literature a photomicrograph of the *Treponema pallidum* taken from a histologic section of the placenta. While these organisms are found in the cord, particularly in the fetal extremities of the cord, and recent reports have shown their presence upon dark-field scrapings of the umbilical vein, yet their discovery in the placental substance happens so infrequently as to be of negligible value pathologically.

Vaginal examination revealed a small mass in the left fornix. It was freely movable and very tender to the touch. There was a brownish bloody discharge from the vagina.

The blood count showed white cells 13,500, with 80 per cent polymorphonuclears, red cells 3,800,000, 65 per cent hemoglobin.

A tentative clinical diagnosis of ectopic pregnancy of the left side was made because there was a history of two months' amenorrhea, a palpable mass on the left side, pain was felt upon pushing against the cervix, and there was a bloody discharge from the vagina.

Six hours later a laparotomy was performed through a midline incision. A blood-tinged serous fluid was found in the abdominal cavity. The left tube was red and congested, the fimbria end was found to be edematous, and hanging from the fimbria by a pedicle 3 cm. long, with two complete twists. There was a dark red cystic mass, the size of a small tangerine (4 cm. by 3 cm.). It was a hydatid cyst of Morgagni. No other pathology was found in the pelvic cavity.

The cyst was removed and the patient made an uneventful recovery.

Histologic Findings: The cyst was lined with a single layer of low cuboidal cells. The vessels in the wall were necrosed and there was some hyalinization. The content of the cyst was a bloody serous fluid.

From a survey of the literature on the subject I could find only one case similar to this one, namely that of Dr. Waters.¹

Besides this there are three others of torsion of the hydatid of Morgagni reported,² but these occurred on the right side and simulated acute appendicitis.

My case, however, differs from that of Dr. Waters in that it occurred in a married woman. It differs from the others in that it occurred on the left side, and, principally, because it simulated an early ruptured ectopic pregnancy as the patient was married and gave a history of irregular menstruation.

REFERENCES

- (1) *Waters*: J. A. M. A. 72: 1072, 1919. (2) *Idem*: Obst. & Gynec. Brit. Emp. 22: 220, 1912; Brit. M. J. 1: 144, 1929; *Heinrich, Abraham*: AM. J. OBST. & GYNEC. 21: 120, 1931.

514 OCEAN PARKWAY

AN UNUSUAL CASE OF POSTPARTUM INFECTION

IRVING B. KRELLENSTEIN, M.D., F.A.C.S., NEW YORK, N. Y.

THIS patient, admitted to Lebanon Hospital, died six hours after a normal delivery with a temperature of 104° F., which could not be accounted for at the time.

The patient was a para ii, twenty-eight years old, had typhus fever many years ago, had a normal spontaneous delivery about three years ago. Her menses began when she was thirteen years old, were always regular, twenty-eight-day type, and would last about three to five days. Her last period was Jan. 26, 1934. She first appeared at the prenatal clinic of Lebanon Hospital on July 11, 1934.

She had experienced no trouble during this pregnancy, except for mild morning sickness of short duration, constipation, and slight leucorrhea. Prior to her pregnancy she developed an abscessed tooth which was not treated. Physical examination disclosed an obese woman about five and one-half months pregnant; otherwise nega-



Fig. 3.—Placenta of inevitable miscarriage at fourteen weeks. (Patient aged 19, gravida ii; 1 previous miscarriage. Wassermann plus 4; Kahn plus 4.) Langhans' cells and the syncytium well preserved; limited number of cells of mesoblast; slight edema of villous stroma. ($\times 150$)

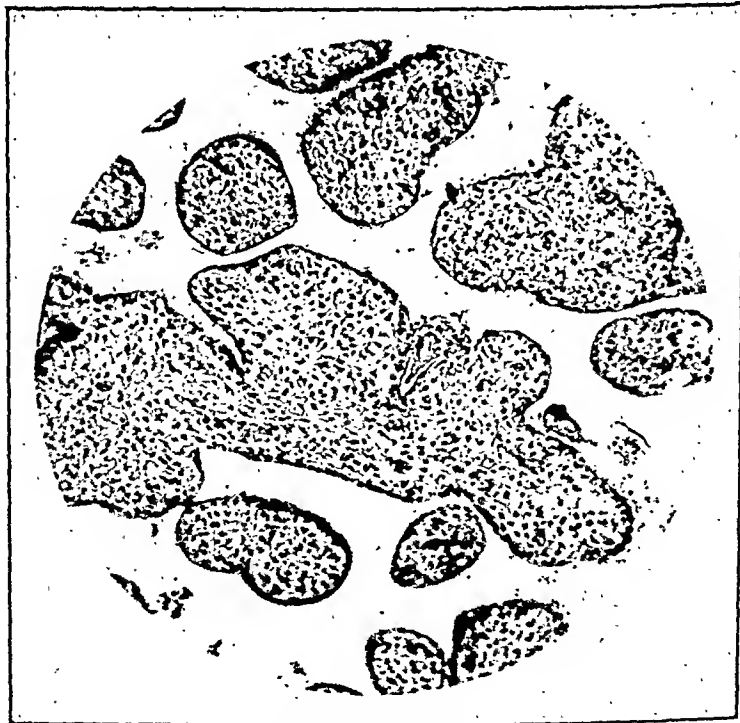


Fig. 4.—Histology of placenta at twenty-four weeks. (Patient aged thirty years; Wassermann and Kahn negative; 2 previous pregnancies, full term, living; spontaneous miscarriage at six lunar months.) Langhans' layer has disappeared; villi are still quite large; note extreme density of cellular elements in villous stroma and few small capillaries. ($\times 150$)

Special Article

CONTRACEPTION, STERILIZATION, AND HYGIENE OF MARRIAGE IN THE MEDICAL CURRICULUM

THE REPORT OF A SURVEY CONDUCTED BY THE NATIONAL COMMITTEE
ON MATERNAL HEALTH, INC.*

REPLIES to a questionnaire sent by the National Committee on Maternal Health, Inc., in 1933 to the seventy-six Grade-A medical schools listed by the American Medical Association in 1932,¹ are here reported and commented upon.

The following letter was written to each Dean:

"Growing interest in the medical control of fertility is shown by the increase in contraceptive clinic services, from twenty-eight in 1928 to one hundred and twenty in 1932; by provision in twenty-seven states for sterilization (without unsexing) of the insane and feeble-minded; by instruction in contraception or sterilization in more than thirty medical schools (1930); and by endorsement of such teaching by certain medical groups.

"We would welcome a statement of your point of view and that of your faculty on the desirability of teaching medical students the indications for and technic of contraception and of sterilization. Have you been able to take steps in this direction? Have legal restrictions, traditions, and local public opinion had a bearing on the matter? If such teaching has been started, please outline the content and method.

"May we learn your viewpoint on a third matter? It is coming to be recognized that much infelicity in marriage arises from inadequate understanding of its physical and mental aspects, and that medical students leave their schools poorly prepared to help their future patients in this respect. Do you consider instruction in the hygiene of marriage to be possible or desirable? If so, should it be part of preventive medicine or gynecology-obstetrics?

"We believe that it will be of considerable interest to medical educators and to the profession generally, to have the consensus of opinion of the deans of the medical schools, and your cooperation in this direction will be greatly appreciated. While we hope that you will wish to answer at length, we enclose a short form for your convenience."

Replies were received from 62 of the 76 medical schools. Forty-seven deans or heads of gynecologic departments not only made out and signed the formal questionnaire, but wrote accompanying letters. Nine of the 76 schools offer only the two-year preclinical course; 67 give clinical instruction. Five of the 67 are under Roman Catholic control, leaving 61 which might instruct in contraception and sterilization. Of these, 59 sent replies, upon which this report is based.

The returns showed that a majority of the Grade A schools were giving some sort of instruction in the medical control of conception. Both sterilization and contraception were taught, though in different departments and in different ways.

*The officers of the Committee: Dr. Haven Emerson, Chairman, Board of Directors; Dr. Robert L. Dickinson, Chairman, Executive Committee; Dr. Frederick C. Holden, Director; Dr. Howard C. Taylor, Jr., Secretary; Dr. Clarence J. Gamble, Treasurer; Dr. Raymond Squier, Executive Secretary.



Fig. 6.—Histology of placental villi at thirty weeks. (Patient aged sixteen years; Wassermann and Kahn negative; gravida ii; 1 previous full-term normal child; premature labor incited in this pregnancy by intercourse.) No increasing vascularity of stroma.

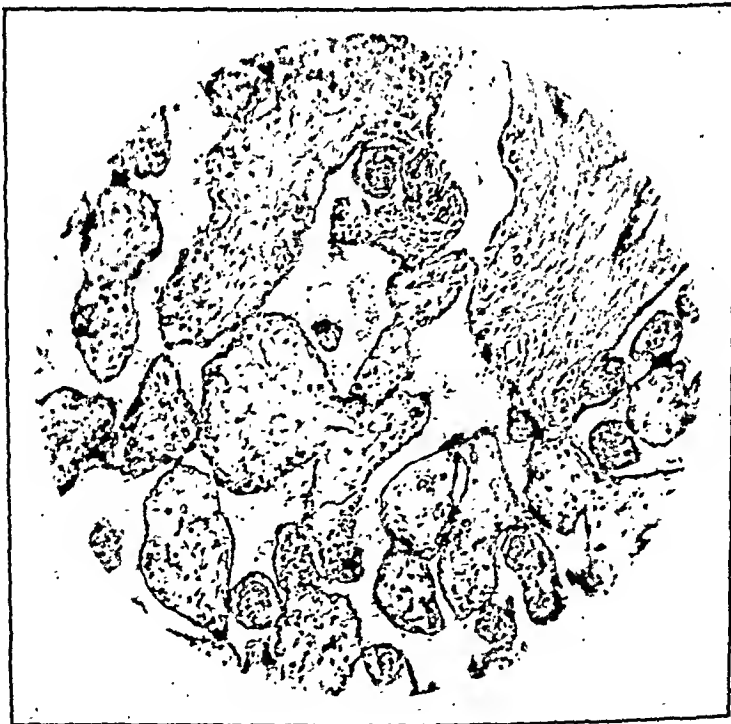


Fig. 7.—Placenta of macerated stillbirth at thirty-two weeks. (Patient aged twenty-eight years; gravida ii; 1 previous miscarriage; fetus macerated and evidently dead for three or four weeks; x-ray of long bones positive for syphilis, although maternal Wassermann and Kahn negative.) Histology similar to placenta of thirty weeks (see Fig. 6) except for presence of edema in villous stroma.

properly directed or instructing medical students had been interfered with by the Government, nor had texts and materials been barred from the mails or common carriers. Although state and federal laws on this subject remain unchanged, so far as the practice of medicine is concerned they are not enforced, but they always constitute a potential danger.

The third inquiry in our questionnaire, which covered marriage counsel, was the one to which the largest number (42) replied. Of these, 32 considered such teaching practicable; 38 desirable. On the negative side three did not consider it practicable and four did not regard it as desirable. Almost everyone who wrote was in accord with the idea that such instruction should be given in the medical school, that it was of great importance to the student, and that it would be of much help to him as he went out into practice; but many deans were of the opinion that there was no one in their particular school who was fitted to give such teaching. One or two said they were going to try out a series of lectures with the hope that some instructor might be developed who would be able to carry on the work. Many deans wrote that they knew of no adequate texts in the field* and so had attempted nothing further than lectures and assigned readings, but were not at all satisfied that all possible was being done. However, there are adequate books of instruction and source books available, as listed in the footnote appended to this report.

Recommendations for graduate and undergraduate instruction in control of fertility have been made by such groups as the New York Academy of Medicine³ and the Committee on Obstetric Education of the White House Conference on Child Health and Protection.⁴

SUMMARY

From the replies received to all the questions submitted to these medical schools on the teaching of contraception, sterilization, premarital examination and the hygiene of marriage some general conclusions may be drawn:

1. Many of the Grade A medical schools are including both contraception and sterilization in their courses of instruction to students. No school appears to have laid out a definite course in either subject as part of its curriculum. The subjects are taught by occasional lectures or clinical instruction or both, and usually in the Senior year.

2. Comparison of replies received by S. Adolphus Knopf in 1929 and 1930⁵ and by the National Committee on Maternal Health in 1933 shows a small gain in the number of medical schools giving information and instruction in the field of contraception and sterilization, more particularly that of sterilization.

3. The marked interest shown by deans of medical schools in the questions of premarital instruction and the hygiene of marriage indicates a growing feeling that these subjects are important and ought not to be neglected.

*Good books written by physicians, some for physicians, some for a wider range of readers, include the following: *For medical practitioners: Dickinson-Bryant: Control of Conception*, Baltimore, 1931, Williams and Wilkins; *Kopp: Birth Control in Practice*, New York, 1934, McBride; *Matsner: Technique of Contraception*, Baltimore, 1934, Williams and Wilkins; *Voge: The Chemistry and Physics of Contraceptives*, London, 1933, Cape. *Factual books, for physicians: Davis: Sex Factors in the Lives of 2,200 Women*, New York, 1929, Harper; *Dickinson: Human Sex Anatomy*, Baltimore 1933, Williams and Wilkins; *Dickinson-Beam: A Thousand Marriages*, Baltimore, 1931, Williams and Wilkins; *Dickinson-Beam: The Single Woman*, Baltimore 1934, Williams and Wilkins; *Hamilton, Gilbert V.: A Research in Marriage*, New York, 1929, Boni. *For readers not necessarily medical: Ellis: Psychology of Sex*, New York, 1933, Long and Smith; *Everett, M. S.: The Hygiene of Marriage*, New York, 1932, Vanguard; *Exner: Sexual Side of Marriage*, New York, 1932, Norton; *Folsom, Joseph K.: Family*, New York, 1934, Wiley; *Groves, Ernest R.: Marriage*, New York, 1933, Holt; *Walker, Kenneth M. (Editor): Preparation for Marriage*, New York, 1933, Norton; *Wright: Sex Factor in Marriage*, New York, 1931, Vanguard; *Dickinson: The Doctor as Marriage Counsellor* (soon to go to press) Baltimore, Williams and Wilkins.

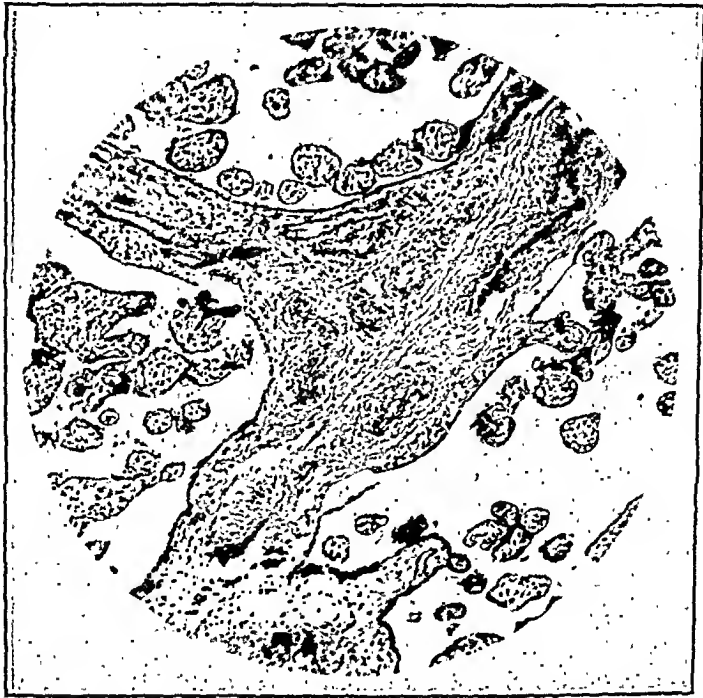


Fig. 10.—Full-term normal placenta with exsanguination of the vascular tree. Note the apparent fibrosis of the placental vessels. ($\times 150$)

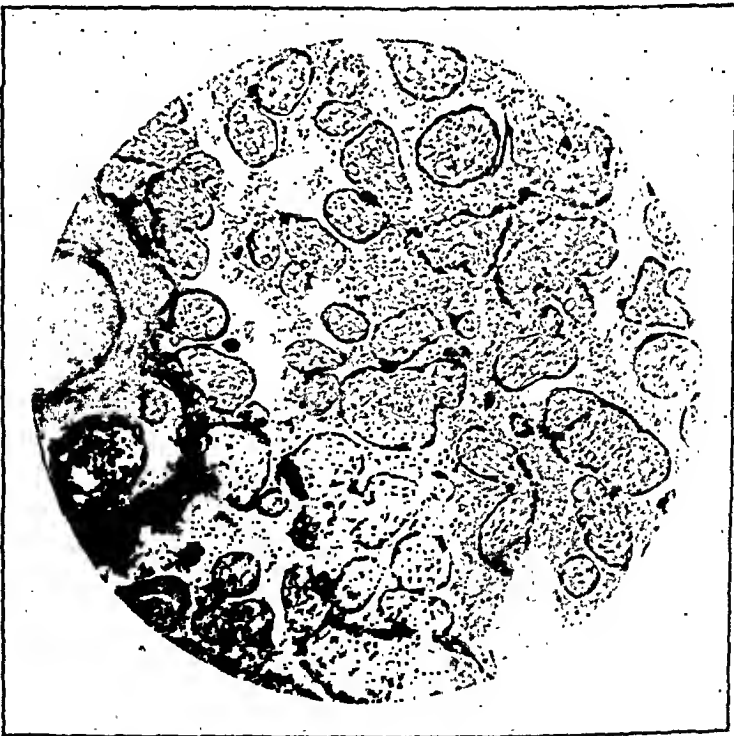


Fig. 11.—Placenta of full-term syphilitic stillbirth. (Gravida viii; 4 previous stillbirths. Wassermann plus 1; Kahn plus 3. Had previous short series of treatments for syphilis.) While the fetus was born at term, it had been dead for some time and the placenta shows evidences of slight immaturity as compared with Fig. 9 or 10. ($\times 150$)

American Journal of Obstetrics and Gynecology

EDITORS: GEORGE W. KOSMAK, M.D., AND HUGO EHRENFEST, M.D.
ASSOCIATE EDITORS: HOWARD C. TAYLOR, JR., M.D., AND
WILLIAM J. DIECKMANN, M.D.

Comment

The Premature Infant

THE Premature Infant Station of the Michael Reese Hospital in Chicago, the Institute of Juvenile Research in Chicago, and the Behavior Research Fund jointly undertook a study of the fate of the prematurely born infant as compared with that of his brothers and sisters of full-term birth. The results of this exhaustive research recently have been presented in a volume entitled *The Physical and Mental Growth of Prematurely Born Children*.¹ This title does not indicate or even suggest that it contains much new information of great interest and practical value to the obstetrician.

The Committee on Factors and Causes of Fetal, New-Born and Maternal Morbidity and Mortality of the last White House Conference (1930), in a special report on Birth and Death Certificates, suggested that "Prematurity" be defined as the birth of a viable fetus after the twenty-eighth week of uterine gestation and having reached at least 35 cm. from crown of head to base of heel with body fully extended; a fetus being considered premature up to 260 days of uterine gestation with a birth weight less than 2,500 grams and length less than 45 cm. --- "Before the twenty-eighth week a fetal death should be recorded as an abortion."

Obviously these definitions simply gave expression to views generally held at that time. The estimation of the "actual duration of uterine gestation" of necessity can be only an approximate one and is subject to inescapable inaccuracies, chiefly because it is based on the usually unconfirmable statement of the mother in regard to the date of her last menstruation. Therefore, in general, more often the birth weight now is accepted as a more reliable indicator of the degree of prematurity. It seems that the chances of survival for an infant

¹The Physical and Mental Growth of Prematurely Born Children. By Julius H. Hess, M.D., George J. Mohr, M.D., Phyllis F. Barthelme, Ph.D. The University of Chicago Press, Chicago, Ill. 1935.

the pregnancy, whether due to syphilis or to some other primary disease of the fetus, such as toxemia or acute infectious disease (Figs. 3, 5, and 7).

From this time on to full term the villi subdivide into smaller units, the capillaries grow more prominent, the syncytial covering thins out into an endothelial-like membrane, and the primary cells of the mesoblastic stroma, for some unknown reason, disappear; whether the latter are absorbed entirely from the villous stroma, attenuated into connective tissue strands, or applied to the margin of small vessels as a part of their connective tissue wall, I cannot say.

In addition to these features of the stroma, which I consider to be evidences of only immaturity of the placenta, I have never been able

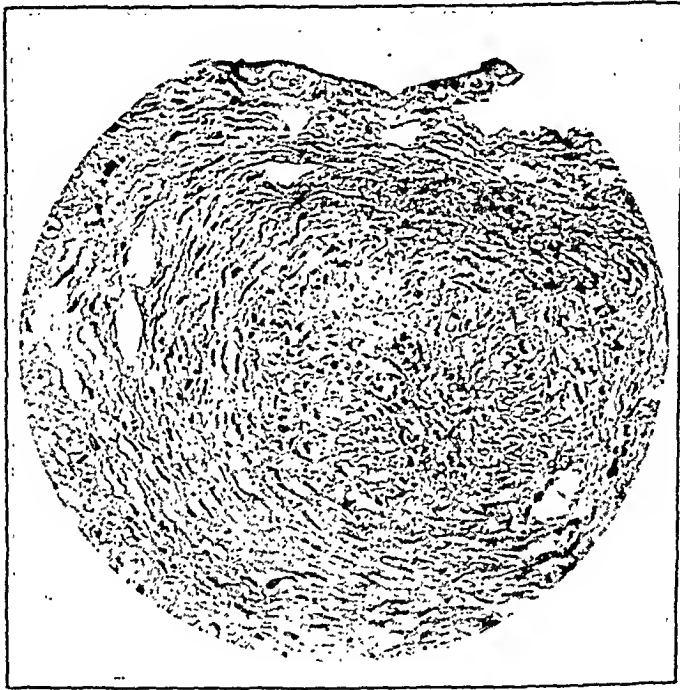


Fig. 13.—Section of a vessel which has collapsed and undergone almost complete obliteration. It was selected from an extensive area of necrosis of the placental villi. ($\times 350$)

to identify true vessel wall lesions, such as one would find in syphilis of the adult. In my opinion there are only two lesions which occur in the vessels of the human placenta. The first of these is an acute inflammation which takes place during the course of labor or upon premature rupture of the membranes. This inflammation is characterized by a diffusion of leucocytes in the wall and perivascular spaces of the cord, in the margin of the placenta, and beneath the fetal surface of the placenta. Such a lesion is a manifestation of acute reaction to trauma or bacterial invasion, and the microscopic appearance reveals neither lymphocytes nor any of the features which characterize syphilitic vasculitis. These acute lesions of the placenta and the placental

much larger. Official statistical figures, calculated merely from death certificates, always run much lower. Many explanations for this fact easily suggest themselves, but one, of particular significance in this connection, is the fact that no health officer will question the diagnosis "prematurity" as direct cause of death if the infant's weight is given as below 2,500 gm.

It has been pointed out repeatedly that in general, especially by neurologists and pediatricians, the importance of birth trauma in the causation of physical and mental defects is exaggerated. Unfortunately most investigations along these lines have been made in institutes for feeble-minded or crippled children, a preceding birth injury being assumed most often merely on the assertion of the mother that she had a very difficult labor. Reliable data in regard to the relationship of birth to later defect can be obtained only with the aid of exact observations made on the newborn by the physician within the first few hours or days of life. From this point of view the researches made on the Chicago material are of particular importance. Among the 987 infants finally discharged from the Premature Infant Station, 102 had been considered as having sustained intracranial damage. Sixty-nine of them have been under close observation and have had from one to four physical examinations or psychometric tests. A little more than 75 per cent of these 69 infants had been born between the thirtieth and thirty-sixth week of gestation, all of them weighed less than 2,500 gm., and as a matter of fact, 45 per cent of them between 1,500 and 2,000 gm., almost 30 per cent between 1,000 and 1,500 gm.

At the time when investigations for this report were ended, 42 infants showed no evidence of brain injury, 11 evidence of severe, 7 of moderate, and 9 of slight damage. Of the 11 severely injured with marked paralytic and spastic symptoms, 7 showed mental retardation. The same observation of mental deficiency was made in 4 of the group of 7 with moderate traumatization at birth. In the last group of 9 with only slight evident damage, 6 were of average intelligence, 2 were retarded, and 1 was classified as "superior." In several of the cases the signs of a resulting defect became manifest only later in life.

Of late, repeatedly the claim has been made that in premature infants subsequent deficiencies are more likely to be due to imperfect development of the central nervous system at the time of birth. Such an argument is considerably weakened by this follow-up made on prematurely born infants who immediately after birth had exhibited suggestive or unmistakable signs of intracranial traumatization. It seems that these new, expertly made observations rather prove that there was no exaggeration in the statement of Vaglio (1921), that the notoriously high mortality of premature infants probably is due rather to the trauma of birth than to immaturity; or in the assertion of Ylppoe, that the fate of the prematurely born infant is chiefly deter-

A reconsideration of the histologic sections leads the author to doubt that either one of the lesions described is a pathologic entity. He sets forth several circumstances which confer upon the placenta a false appearance of fibrosis, namely: normal variation in architecture between different placentas, variation between individual sections of the same placenta, collapse of the vascular tree of the placenta, and states of immaturity of the organ.

Particular objection is raised to the practice of loosely applying the term "fibrosis" to indurated areas of the afterbirth. These areas are found upon microscopic examination to be zones of necrosis or of intervillous thrombosis.

Attention is then directed to "lesions" of the syphilitic placenta: hyperplasia of the connective tissue stroma and vessel wall alterations. The author finds no disturbances here which can be directly attributed to syphilis as a disease. Instead he interprets these "lesions" as evidences of arrest of development of the placenta due to arrest of fetal vitality. He finds precisely the same appearances in stillbirths of the same period due to other causes.

CONCLUSIONS

1. Fibrosis of the placenta and its vessels is not a pathologic entity.
2. Recognition of such lesions is a misinterpretation of placental histology, and their apparent presence has no effect upon the growth or vitality of the fetus.
3. While the human placenta may transmit the organism of syphilis from an infected mother to the embryo, it seems possessed of some peculiar resistance to the development of true syphilitic lesions in itself.
4. Although the placenta of the syphilitic stillbirth is usually large in proportion to the fetus, is light in color, presents a greasy surface, and reveals upon microscopic examination large fibrotic villi, these same characteristics occur in most premature stillbirths and cannot be accepted as criteria of any specific disease.

Acknowledgment.—I wish to express my gratitude to Professor P. Brooke Bland for his interest and encouragement, and for aid in the providing of materials and technical help to conduct these investigations.

I am also deeply indebted to the personnel of the Laboratories of Pathology of the Jefferson Hospital for their assistance, particularly the Director, Dr. Baxter L. Crawford, and his associate, Dr. Carl J. Bucher.

1930 CHESTNUT STREET

REFERENCES

- (1) *Agueci, Aurelio*: *Pathologica* 23: 413, 1933. (2) *Castallo, Mario A., and Montgomery, Thaddeus L.*: *AM. J. OBST. & GYNEC.* 30: 37, 1935. (3) *Ciulla, U.*: *Folia Gynaecologica-Demographica* 31: 641, 1934. (4) *Fryemura, Gencho*: *J. Morph.* 35: 485, 1921. (5) *Karsner, Howard T.*: *Human Pathology*, ed. 3, Philadelphia, 1931, J. B. Lippincott Co. (6) *Kobak, M. S.*: *AM. J. OBST. & GYNEC.* 19: 299, 1930. (7) *McCord, J. R.*: *AM. J. OBST. & GYNEC.* 28: 743, 1934. (8) *Montgomery, Thaddeus L.*: *AM. J. OBST. & GYNEC.* 21: 157, 1931. (9) *Montgomery, Thaddeus L.*: *AM. J. OBST. & GYNEC.* 25: 320, 1933. (10) *Olin, T. E.*: *Arb.*

Department of Reviews and Abstracts

CONDUCTED BY HUGO EHRENFEST, M.D.

Collective Review

THE ESTROGENIC, CARCINOGENIC, AND ANTERIOR PITUITARY GROWTH PRINCIPLES, AND THEIR CLINICAL RELATION TO BENIGN AND MALIGNANT TUMORS

J. THORNWELL WITHERSPOON, M.A. (OXON), M.D., NEW ORLEANS, LA.

(From the Department of Gynecology, Tulane University, School of Medicine)

CLINICAL interest in the relationship between the estrogenic and carcinogenic principles has been intensified by the fact that certain substances which produce animal carcinoma are somewhat similar chemically to the estrogenic hormone, and even produce estrous changes.¹ The molecular structure of the estrogenic and carcinogenic compounds, 1-2-benzpyrene, 5-6-cyclopenteno-1-2-benanthracene and 1-2-5-6-dibenzanthracene, which are nonsaturated hydrocarbons possessing the tricyclic phenanthrene ring, is very similar. The actions of these principles are also somewhat alike as each exhibits growth promoting properties, involving epithelial tissue primarily; their actions differ, however, in that the estrogenic hormone is essentially a sexual growth stimulating factor, affecting especially the female genital tract and the mammary glands, while the action of the carcinogenic agent is growth stimulation of any and all body tissue.

Loeb² has excellently demonstrated a comparison of these two principles and has drawn the conclusion that (1) there are substances which are both carcinogenic and estrogenic; (2) there are carcinogenic substances which are not estrogenic; (3) there are estrogenic substances which are not carcinogenic; and (4) even in cases in which the compounds are both estrogenic and carcinogenic, there is no parallelism between the strength of their activities.

In 1931 Dodds³ issued a warning, "I do not think that the amazing potency of theelin (the estrogenic hormone) is recognized by the majority of cancer research workers. It is capable of producing the most extensive tissue proliferation and cell growth, and this appears to me to be of the utmost importance." Administration of the estrogenic hormone results in hypertrophy and hyperplasia of only and all the female secondary sexual organs including the breasts, while castration (lack of the estrogenic principle) in female mice under six months of age leads to marked retardation of the rate of growth of mammary cancer, but does not prevent the experimental production of cancer by carcinogenic agents.^{4, 5} The effect of castration is greater the earlier it is done. If castration is performed after the tumor inoculation, retardation of growth is not as effective.⁶ Castration, however, has no effect on the growth of animal sarcoma⁷ and skin cancer.⁸ This undoubtedly is due to the fact that the estrogenic principle is only a sexual growth stimulating factor

OPERATIVE TREATMENT OF URINARY INCONTINENCE*

MARION DOUGLASS, M.D., F.A.C.S., CLEVELAND, OHIO

(From the Department of Obstetrics and Gynecology, Western Reserve University School of Medicine, and the Lakeside Hospital)

SINCE 1928 we have been interested in the problem of urinary incontinence and its methods of treatment, and during that time have treated and followed carefully a series of cases of its various types. A number of surgical methods, most of them standard operations, have been employed and a few modifications, devised for individual cases, have been given a trial. The subject is rather specialized and might seem to be of limited interest, but many cases of urinary incontinence are so hopeless often and so eager for surgical relief that a consideration of operative methods seems worth while. Urinary leakage is one of the most troublesome ailments with which patients are ever afflicted. The mechanism of urinary control, which under normal circumstances functions so perfectly, is rarely appreciated until due to relaxation, accidents or disease, it becomes functionally incompetent or organically damaged.

Since the time of Rounhuise in the latter part of the seventeenth century there have been consistent attempts to improve upon the operative methods which may be employed in dealing with urinary leakage. The history of vesicovaginal fistula primarily due to the work of its pioneer surgeon, Marion Sims, is best known in the surgery of urinary leakage, but the advances made and cures obtained through the efforts of Kelly. Ward, Rawls and others have so improved surgical attack that almost any patient may be promised great improvement or even a clinical cure although several surgical procedures may be necessary. Crossen has presented detailed descriptions of technic in his volume *Technique of Gynecological Surgery*. Many isolated cases of all types have been reported which have been benefited or cured by many different methods (Young).

Relief of incontinence depends to the greatest extent for its success upon the proper choice of methods in the various types of incontinence. It is the purpose of this paper to give a brief consideration to those types and the methods best adapted to their treatment with the report of some typical cases.

Although vesicovaginal fistulas have been described in mummies as early as the second Egyptian dynasty apparently no suggestions for its treatment were considered until the time of Ambrose P  re in 1570. Marion Sims, in 1850, was the first to employ the three essentials, exposure, closure by suture, and catheter drainage.

*Read at the Forty-Eighth Annual Meeting of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons held at Skytop, Pa., September 16 to 18, 1935.

uterine fibroids and excessive estrogenic activity, it may possibly be concluded that increased and prolonged stimulation on the myometrium by the estrogenic hormone will subsequently result in uterine fibroid formation.

ENDOMETRIOMAS

Endometriomas are also under the influence of the estrogenic hormone. Their morphologic and functional characteristics are similar to the uterine endometrium; the integrity and function of endometriomas are dependent upon the presence of active ovarian tissue, since castration causes regression of the tumor; they present decidual reaction during pregnancy, and undergo the rhythmic endometrial changes of the menstrual cycle.

Since the estrogenic hormone is the cause of endometrial hyperplasia, and since the histologic structure of endometriomas and uterine endometrium are similar, it is logical to deduce that the igniting growth factor of endometriomas, which brings about cellular metaplasia or endometrial implant proliferation, is the estrogenic principle. That such is the case is all the more established by the fact that many endometriomas present histologically endometrial hyperplasia, and also by the high incidence of association of endometriomas with uterine endometrial hyperplasia. The frequent finding of all the features of endometrial hyperplasia in the endometriomas, accompanied by similar changes in the uterine mucosa, can only be caused by the factor which definitely determines the latter, the estrogenic hormone.

BENIGN AND MALIGNANT TUMORS OF THE BREAST

The stimulating and growth promoting action of the estrogenic hormone is the main factor in mammary development at puberty. Watson has demonstrated marked breast development in a nineteen-year-old hypogonadal amenorrheic girl who was given the estrogenic hormone in 500,000 R.U. doses, and Geschieker and coworkers,²⁰ while investigating the action of this hormone upon breast hypertrophy and tumor formation, conclude that gynecomastia in the male and virginal hypertrophy and fibroadenoma in the female breast are dependent upon pathologic variations in the action of the estrogenic hormone upon the duct epithelium and surrounding breast tissue. These observers have demonstrated the presence of the estrogenic principle in a fibroadenoma of the breast.

Since the growth rate of mammary cancer in animals is accelerated by the estrogenic principle, and since breast hypertrophy and benign tumor formation in human beings are influenced by this hormone, it seems logical to conclude that human breast malignancy may also be affected by the action of the estrogenic hormone. In the treatment of mammary malignancy, therefore, estrogenic activity should be removed, since its presence may be an exciting growth factor.

In carcinoma of the breast in women under the menopausal age, estrogenic activity is generally not destroyed, and it continues to exert its growth stimulating effect on the, if any, remaining cancer cells. In addition, therefore, to surgery, in the treatment of cancer of the breast in women who have not reached the menopause, all ovarian activity and secretion should be removed either by radium or deep x-ray therapy. Induction of the menopause, especially in young women, in the treatment of carcinoma of the breast may seem somewhat radical, but in view of the tremendous growth promoting action of the estrogenic principle on sexual tissue, this treatment is very rational. That elimination of estrogenic activity may be beneficial in the treatment of malignancy of the breast in women who are still in their functional years could possibly be demonstrated by an analysis of a series of five-year cures of cancer of the breast before and after the menopause. If elimination of estrogenic activity is beneficial in the treatment of mammary malignancy, there should be more cures of this condition in postmenopausal women, discounting of course the age element and the extent of the malignancy.

The treatment of extravescical ureters is relatively easily carried out once the diagnosis is made. In general it may be said that the incontinence due to cord lesions in congenital defects cannot be well treated by plastic surgery. Implantation of the ureters into the rectum is advisable, being about the only surgical possibility. This also holds for extrophy of the bladder. I am performing a series of operations on a patient with extrophy at the present time by the transvesical approach.

II. (A) ACQUIRED DEFECTS—TRAUMA AND RELAXATION

By all odds the most common type of relative or intermittent incontinence is relaxation of the vesical neck due to dystocia or defective tissue. This occurs most frequently after extreme dystocia, breech, or difficult forceps delivery, etc. Certain patients seem predisposed to development of urinary incontinence of a minor or intermittent type, i.e., tendency to lose urine when coughing or straining or where the bladder is abnormally full, apparently due to defective tissue.

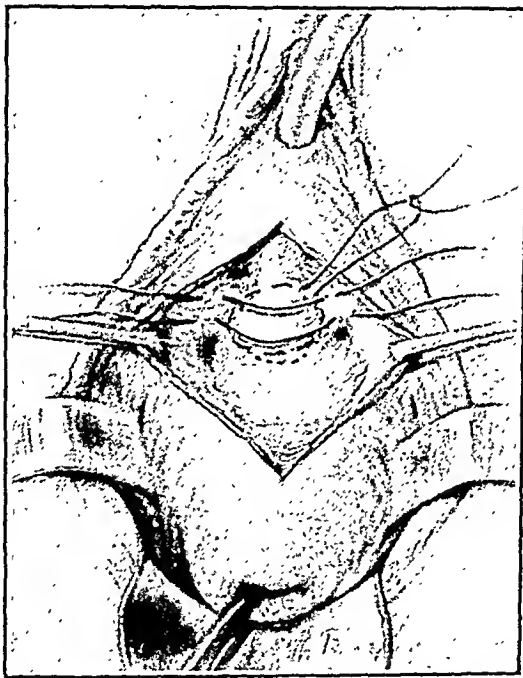


Fig. 1.—Repair of vesical neck where bladder is thin and redundant by means of superimposed purse-string sutures combined with a mattress suture (Kelly).

These cases are seen principally in women who have had numerous rapid pregnancies and in women of advanced years. The Kelly method is usually sufficient. Other methods which may be used are the advancement of the urethra as advocated by Pawlik or twisting of the urethra with advancement. For example, a typical patient is a young woman, twenty years of age, who entered the hospital complaining of incontinence of urine since delivery of her first child with a difficult forceps procedure. Pelvic examination revealed no abnormality except moderate relaxation with a very rigid perineum, and a wire-edge scar completely encircling the lower half of the vagina. The typical Kelly procedure resulted in complete cure.

II. (B) RELAXATION OF VESICAL NECK ASSOCIATED WITH CYSTOCELE OR VESICAL PROLAPSE

There is a distinct group of patients who have marked relaxation of the pelvic floor associated with relaxation of the vesical neck, i.e., a marked cystocele and rectocele with some degree of prolapsus uteri. The problem here is more com-

in some of the irradiated animals, and by the normal ovarian reactions after the administration of the pregnancy urine hormone.

If any clinical observation can be gleaned from these animal experiments, it is the possible irradiation of the human pituitary gland in cancerous patients, in addition to surgery or local radium treatment. Rodent cancer is a far jump to human cancer, and the majority of experimental animal cancer is tested on fairly young animals when the growth stimulating factor is active, while human cancer tends to occur in elderly patients, when the anterior pituitary growth principle should be relatively inactive, although Wyeth²⁹ and others have shown increase in weight of the anterior hypophysis in cancerous patients, due to proliferation mainly of the eosinophile (growth) cells.

The possible beneficial effects of pituitary irradiation, in paralyzing and repeated doses, to all carcinomatous and sarcomatous patients as well as to genital and mammary malignancies, in addition to elimination of the estrogenic activity, can only be speculated upon. The application of this treatment to cancerous patients, superimposed upon the local therapy of surgery or radium, will have to be tested over a fairly long period of time and then checked against a series of nonirradiated pituitary cancerous cases. The very encouraging results, from animal pituitary irradiation, however, seem to justify such an investigation.

In theory, pituitary irradiation should be more beneficial in checking human malignant growth rates than those in young animals. Clinical cancer generally develops when the patient's growth weight is stationary or even declining, a factor necessary to obtain the tumor growth retardation effect in animals. Even human prophylactic pituitary irradiation of noncancerous menopausal or postmenopausal patients may have its place.

As Bischoff points out, the most important question is whether the anterior lobe growth principle functions alone in accelerating tumor growth or whether another pituitary mechanism induces retardation of tumor growth. From the experiments of the anterior hypophyseal replacement therapy, in which administration of the growth promoting principle counteracted the effect of pituitary irradiation, both in regard to body and tumor growth, it seems most probable that the growth principle of the anterior pituitary gland is both a body and tumor growth accelerating factor.

REFERENCES

- (1) Cook, J. W., Dodds, E. C., and Hewett, C. L.: *Nature* 131: 56, 1933. (2) Loeb, L.: *J. A. M. A.* 104: 1597, 1935. (3) Dodds, E. C.: *Am. J. Cancer* 15: 2765, 1931. (4) Lathrop, A. S. C., and Loeb, L.: *J. Cancer Research* 1: 1, 1916. (5) Loeb, L., and Genther, I. T.: *Proc. Soc. Exper. Biol. & Med.* 25: 809, 1928. (6) Pribram, E.: *Ztschr. f. Krebsforsch.* 39: 399, 1933. (7) Molnar, K.: *Ztschr. f. Krebsforsch.* 38: 188, 1932. (8) Bischoff, F., Maxwell, L. C., and Ullmann, H. J.: *J. Biol. Chem.* 80: 92, 1931. (9) Lacassagne, A.: *Compt. rend. Acad. de se.* 195: 630, 1932. (10) Burrows, W.: *Am. J. Cancer* 20: 48, 1934. (11) Cook, J. W., and Dodds, E. C.: *Nature* 131: 205, 1933. (12) Novak, E., and Brawner, J. N.: *Am. J. Obst. & Gynec.* 28: 637, 1934. (13) Witherspoon, J. T.: *Surg. Gynec. Obst.* 56: 1026, 1933. (14) Dodds, E. C.: *Lancet* 1: 931, 1937, and 1048, 1934. (15) Clauberg, C.: *Zentralbl. f. Gynäk.* 57: 1991, 1933. (16) Witherspoon, J. T.: *Surg. Gynec. Obst.* 58: 57, 1934. (17) Witherspoon, J. T.: *Surg. Gynec. Obst.*, Dec., 1935. (18) Witherspoon, J. T.: *Am. J. Cancer*, June, 1935. (19) Lewis, D., and Geschickter, C. F.: *J. A. M. A.* 104: 45, 1925. (20) Geschickter, C. F., Lewis, D., and Hartman, C. G.: *Am. J. Cancer* 21: 828, 1934. (21) Ball, H. A., Samuels, L. T., and Simpson, W.: *Am. J. Cancer* 16: 351, 1932. (22) McEuen, C. S.: *Proc. Soc. Exper. Biol. & Med.* 30: 928, 1932-33. (23) Reiss, M., Druckrey, H., and Hochwald, A.: *Klin. Wchnsehr.* 12: 1049, 1933. (24) Bischoff, F., Maxwell, L. C., and Ullmann, H. J.: *Am. J. Cancer* 21: 329, 1934. (25) Zondek, H., Zondek, B., and Hartoch, W.: *Klin. Wchnsehr.* 11: 1785, 1932. (26) Moeller, H.: *Ztschr. f. Path.* 45: 571, 1933. (27) Evans, H. M., and Simpson, M. E.: *J. A. M. A.* 91: 1337, 1928. (28) Bischoff, F., Maxwell, L. C., and Ullmann, H. J.: *Science* 71: 16, 1931. (29) Wyeth, G. A.: *Endocrinology* 18: 59, 1934.

out tissues. This has proved effective in our hands in one case; the patient had been treated first by the Kelly method alone, and then by a modified Kelly technic with advancement of the urethra (Figs. 1 and 2). Of this variety of patients with and without marked cystocele and prolapse, we have had eight patients with a satisfactory result.

III. VESICOVAGINAL FISTULA

As it has been previously pointed out in the early history of the surgery of urinary incontinence, vesicovaginal fistula has dominated the picture. The early work of Sims and Emmet marks the beginning of modern operative treatment. The

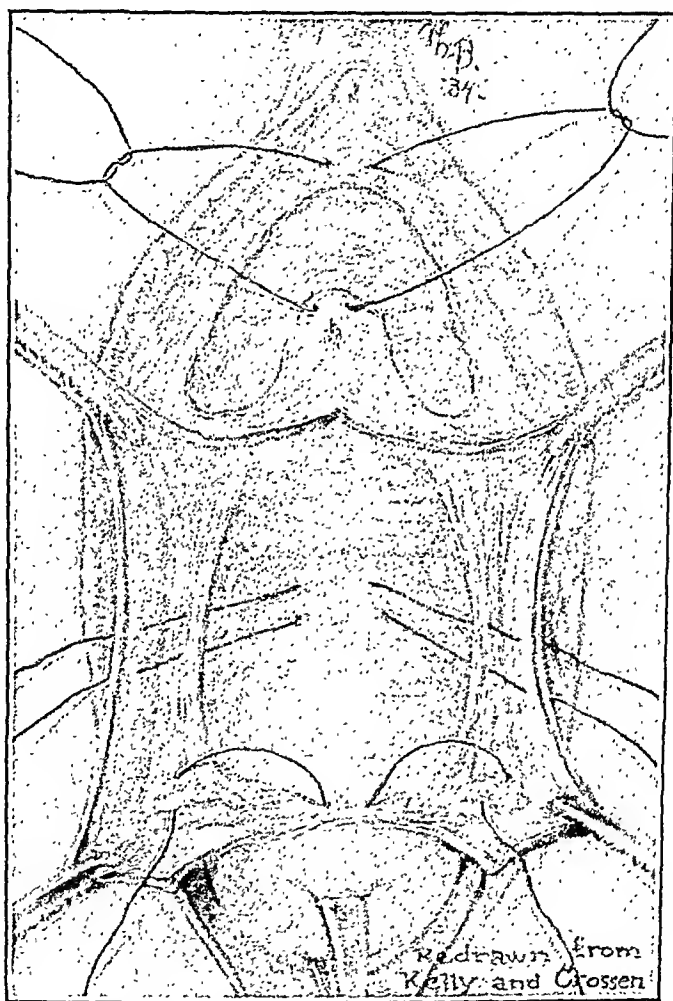


Fig. 3.—Procedure best employed in certain cases of incontinence with cystocele and first degree prolapsus advancement of the urethra (Pawlik) plus advancement of the bladder; Kelly operation may be combined with this.

classical method of Sims, using silver wire, consisted in the essentials of trimming the edges and closure by suture. Rawls, Watkins, and others have advocated flap splitting and mobilization of the bladder in the operative attack. This is much the same as the dissection of the anterior vesical wall and free mobilization of the bladder, which is used by many operators for cystocele repair. It is not in the scope of this paper to mention all the procedures which have been suggested to deal with certain types of fistulas. Kelly, Farrar, Noble, and Ward have devised modifications for various types of fistulas. The transvesical route has been of interest to us, and we are including in this series several successful cases so treated.

stasis and drainage, on cellular reactions called forth for defense, and has very little to do with fancy theories of immunity or selective affinity of certain strains of bacteria for certain tissues.

Septicemia, in many of these cases, is only intermittent. Bacteria do not multiply and grow in the blood, but are discharged into it from primary or secondary depots, usually in an intermittent fashion. When thrown into the circulating blood, nature makes every effort quickly to rid the blood stream of their presence through its organs of elimination and filtration. The application of chemotherapy in intravenous injections of mercurochrome, gentian-violet and other like substances, is only excusable on the premise of attempting to kill those organisms circulating in the blood at the time of the injections, and thus to prevent the establishment of secondary foci in other parts of the body. As one is unable to know when the blood is being showered, the hopelessness of such procedure seems convincing.

While the anatomic view of the subject leads immediately to the possibility of radical surgery in its eradication, the obvious difficulty in knowing how far the process has extended, greatly restricts surgery to incision and drainage of localized collections of pus, and to rare cases where either the immediate ligation of thrombosed vessels or a quick hysterectomy for a uterus containing multiple abscesses might be seriously considered.

J. THORNWELL WITHERSPOON.

Olason, S.: *The Necessity for Strict Isolation of Septic Cases*, Acta obst. et gynec. Scandinav. 14: 289, 1934.

The author carefully investigated the deaths which occurred in his hospital in Stockholm with special reference to cases of sepsis observed not only postpartum but also postabortal. He found abundant evidence to support the view that septic abortions cannot be treated in a lying-in hospital without occasioning a certain amount of danger to recently delivered women unless there is *complete* isolation of the septic cases.

J. P. GREENHILL.

Stähler, F.: *Report of One Hundred Eighty-Seven Cases of Puerperal Sepsis and Pyemia Observed During Twelve Years at the Frankfurt Women's Clinic*, Monatschr. Geburtsh. u. Gynäk. 99: 193, 1935.

Among 187 cases of puerperal sepsis and pyemia 63.6 per cent were cured. In 139 cases the clinical picture was that of pure pyemia. In this group 68 per cent were cured.

Among 16,704 labor cases the mortality for puerperal sepsis was 0.024 per cent and the morbidity 0.17 per cent. The number of chills does not seem to have any special significance in cases of sepsis. In three cases ligation of pelvic veins was performed but all three women died. The author collected from the literature reports of 32 cases of ligation of pelvic veins with 9 recoveries. He compares the best results obtained with operative procedures (63 per cent) with his 68.2 per cent of cures by conservative therapy, and outlines the treatment employed in this large series of cases of puerperal sepsis. A large number of drugs were used and therapeutic measures carried out, including the injection of metals such as silver, gold, copper, iron, and mercury, chemicals such as arsenic, bismuth, iodine and sulphur; colloidal preparations, and dyes such as methylene blue, trypanflavin, rivanol, etc. However, all of these substances were sooner or later given up. The author found that serum therapy when given early helped in some cases. Blood transfusion was of distinct help. During the last few years

Baker Brown, Noble, Sellheim, and many others. Artificial sphincters have been constructed by various methods (Deming, Taussig, Martius, etc.). We reported in detail in 1931 before the American Gynecological Association three cases of complete loss of urethral and vesical sphincter treated by a modification of Taussig's method with almost complete cure within limits of emptying the bladder about every hour. Two of these patients are still under observation and in good condition.

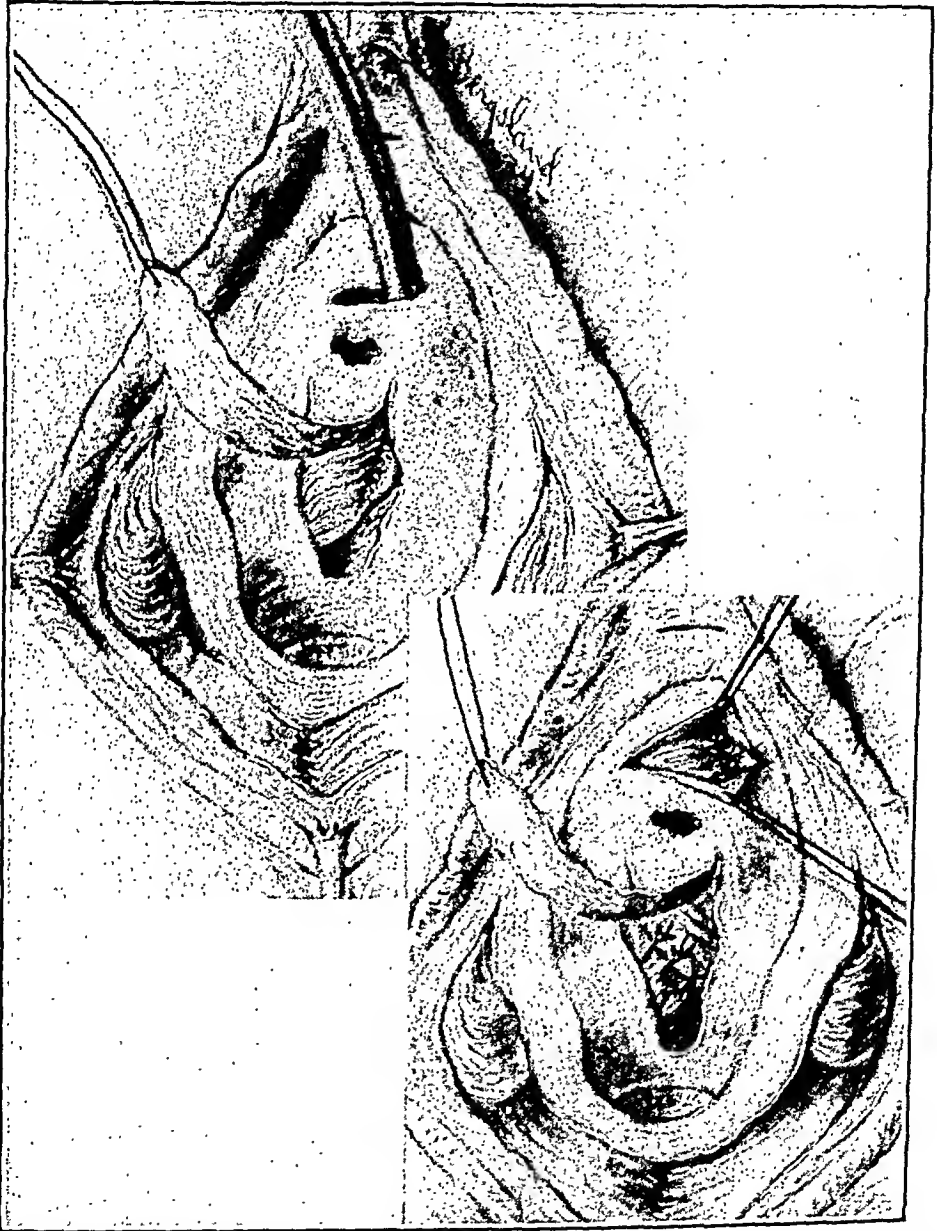


Fig. 5.—Levator flap transplantation (McGaw-Douglass) applicable to certain cases with destruction of the urethra and vesical sphincter may be combined with operation for reconstruction of the urethra.

Since then we have operated upon three more patients, one who is a complete failure, one who is much improved, and one who is cured following four operative procedures. I briefly summarize the methods used in the last case.

The patient is twenty-six years old, incontinence of urine after forceps delivery. She had two unsuccessful attempts at repair at other hospitals. There was complete destruction of the urethral sphincter, it being possible to put the tip of the

The most common cause for the bleeding was atony and subinvolution and the responsible factors for this were age, parity, constitutional anomalies, general debility, fixation operations on the uterus, overstretching of the uterus as in polyhydramnion, large child, abruptio placentae, and operative, very rapid but also very slow emptying of the uterus. Other factors were disturbances in the third stage of labor, fever and infectious processes in the genitalia during the puerperium.

In ten cases, the uterine cavity had to be explored. In four cases, nothing was found but the stimulation had a beneficial effect and the bleeding ceased. No complications were observed as a consequence of these manipulations.

J. P. GREENHILL.

Kochmann, G.: Blood Transfusion in Cases of Puerperal Sepsis and Secondary Anemia, *Monatschr. f. Geburtsh. u. Gynäk.* 93: 154, 1933.

At the Danzig clinic it has recently been the custom to treat all the severe cases of puerperal sepsis systematically with blood transfusion. No ill effects have been observed from this procedure. The benefits are: (1) In many cases of sepsis there is an anemia and this is overcome rapidly by the transfusion; (2) In cases of sepsis there is a diminution in the protective ferments, antitoxic and antibacterial properties of the blood and these are replaced by the transfused blood; (3) The transfused blood improves the circulation which is usually depressed by sepsis; (4) The injected blood acts as a strong stimulus to the defense mechanism of the body against infection. Of 16 seriously ill septic patients treated by means of blood transfusion 11 died and 5 recovered.

Blood transfusion is also indicated in cases of secondary anemia as a result of loss of blood from the genitalia. Such bleeding occurs in women with myomas and metropathies and after labor and abortions.

In the opinion of the author blood transfusions should be used much more frequently than they are at the present time, both as a prophylactic measure and therapeutically in cases of severe loss of blood during and after labor.

J. P. GREENHILL.

Serdukoff, M. G.: The Actual Therapy of Puerperal Fever, *Gynécologie* 33: 622, 1934.

The author outlines his treatment of puerperal fever as follows: For cases of circumscribed parametritis, adnexal inflammation, and thrombophlebitis, he advises rest in bed, ice bags, oxytocic drugs, umbilical cord blood, autohemotherapy, local immunization, and narcotics. If there is no suppuration, he inserts ichthyol tampons in the vagina, gives hot baths under electric lamps, vaccine therapy, and hypodermic injections of turpentine. Where suppuration is present, he incises and drains by means of a posterior colpotomy. In severe cases he resorts to blood transfusions.

He employs specific therapy in the form of intravenous injection of alcohol, umbilical cord serum, blood transfusions, roentgen ray therapy, and fixation abscesses. In mild cases he advocates intravenous injections of urotropin, calcium chloride, distilled water, and silver nitrate.

J. P. GREENHILL.

forefinger into the urinary bladder. Transplantation of the levator flaps was performed and the patient was discharged completely continent within the limits of emptying the bladder every hour and a half when on her feet. The patient remained continent for three months, when approximately at the time of renewal of her coitus, her incontinence returned, making it necessary for the patient to wear pads constantly. In the next operative procedure it was attempted to narrow the urethra by a horseshoe denudation above the urethra after the method of Pawlik, with narrowing of the urethra. This operation was a complete failure. At the third operation the posterior wall of the urethra could be demonstrated as being approximately 2 cm. in length. An attempt was made to imbricate the presumable site of the bladder neck by a Kelly mattress suture and the use of multiple purse-string

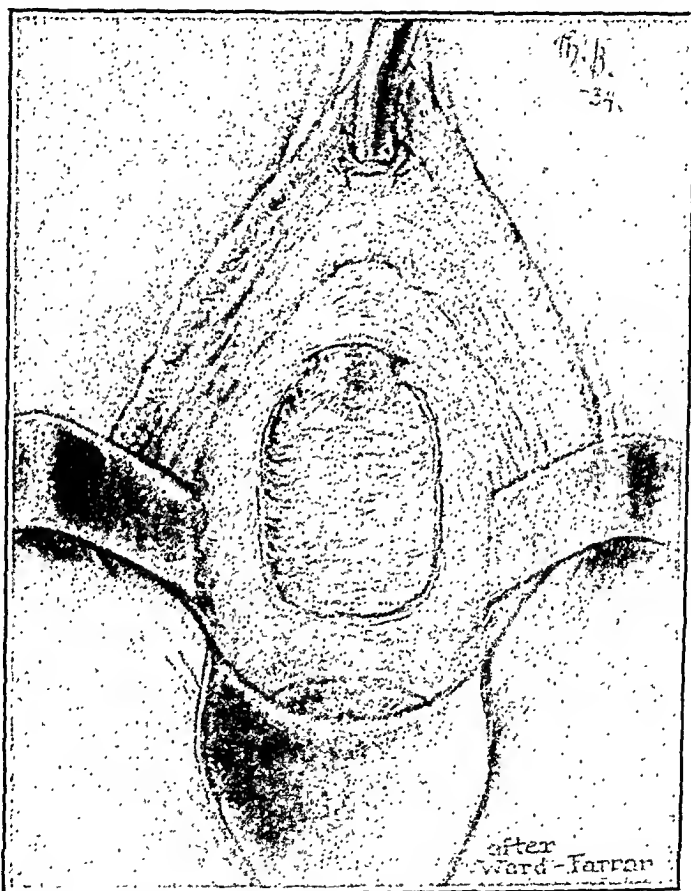


Fig. 8.—Showing tube as synthetic urethra placed in tunnel. This was employed successfully in one patient in this series.

sutures after the method described by Crossen to support the paraurethral structures. Suprapubic drainage was performed. In this case, two and one-half months following discharge from the hospital, the patient stated that she was continent, and had good voluntary control. Within six months the patient was again incontinent. This was due again presumably to the pull on the perineum following resumption of coitus. A fourth operation was performed later and consisted of the Ward-Farrar operation. The new urethra was a complete take and the patient is now continent after one and one-half years. This case demonstrates the difficulty met with in dealing with cases of absent sphincter and urethra and illustrates to some extent how the attack must be modified according to the tissues which are available to the operator at successive operative procedures.

CONNECTICUT

COGAN, G. E., HARTFORD
 CREADICK, A. N., NEW HAVEN
 HERSHMAN, A. A., NEW HAVEN
 HOWARD, J. H., BRIDGEPORT
 LEWIS, R. M., NEW HAVEN
 MILLER, J. R., HARTFORD
 MORSE, A. H., NEW HAVEN
 PERRINS, H. B., NEW HAVEN
 STORRS, R. W., HARTFORD
 THOMPSON, H. G., HARTFORD
 THOMS, HERBERT, NEW HAVEN

DISTRICT OF COLUMBIA

CROWLEY, J. F., WASHINGTON
 DARNER, H. L., WASHINGTON
 DAVIS, DANIEL, WASHINGTON
 GARNETT, A. Y. P., WASHINGTON
 JACOBS, J. B., WASHINGTON
 KANE, H. F., WASHINGTON
 MUNDELL, J. J., WASHINGTON
 NOTES, BERNARD, WASHINGTON
 ROSS, J. W., WASHINGTON
 *SULLIVAN, R. Y., WASHINGTON
 TITUS, E. W., WASHINGTON
 WILLSON, PRENTISS, WASHINGTON

FLORIDA

STRUMPF, I. J., JACKSONVILLE

GEORGIA

BARTHOLOMEW, R. A., ATLANTA
 COLVIN, E. D., ATLANTA
 MCCORD, J. R., ATLANTA
 SHARPLEY, H. F., JR., SAVANNAH

ILLINOIS

ADAIR, F. L., CHICAGO
 BACON, C. S., CHICAGO
 BAER, J. L., CHICAGO
 BLOOMFIELD, J. H., CHICAGO
 BROWNE, W. H., CHICAGO
 BUXBAUM, HENRY, CHICAGO
 CARY, EUGENE, CHICAGO
 COOLEY, WILLIAM, PEORIA
 CORNELL, E. L., CHICAGO
 CULBERTSON, CAREY, CHICAGO
 CURTIS, A. H., CHICAGO
 DAILY, E. F., CHICAGO
 DANFORTH, W. C., EVANSTON
 DAVIS, M. E., CHICAGO
 DELEE, J. B., CHICAGO
 DIECKMANN, W. J., CHICAGO
 DORLAND, W. A. N., CHICAGO
 EDWARDS, E. A., CHICAGO
 FALLS, F. H., CHICAGO
 FISCHMANN, E. W., CHICAGO
 FITZGERALD, J. E., CHICAGO
 FOX, P. C., OAK PARK
 FRANKENTHAL, L. E., CHICAGO
 FRANKENTHAL, L. E., JR., CHICAGO
 GALLOWAY, C. E., EVANSTON
 GOLDSTINE, M. T., CHICAGO
 GOUGH, J. A., CHICAGO
 GREENHILL, J. P., CHICAGO
 GRIER, R. M., EVANSTON
 HEANEY, N. S., CHICAGO
 HESSELTINE, H. C., CHICAGO
 HOLMES, R. W., CHICAGO
 HORNER, D. A., CHICAGO
 JONES, H. O., CHICAGO
 KANTER, A. E., CHICAGO
 LACKNER, J. E., CHICAGO
 LASH, A. F., CHICAGO
 LITT, SOL, CHICAGO
 MACEACHERN, M. T., CHICAGO
 MALCOLM, W. A., PEORIA
 PARSONS, ELOISE, CHICAGO
 REED, C. B., CHICAGO
 RUDOLPH, LOUIS, CHICAGO
 SCHMITZ, HENRY, CHICAGO
 SCHMITZ, H. E., CHICAGO
 SCHOCHET, S. S., CHICAGO
 SCOTT, R. A., EVANSTON
 SERED, HARRY, CHICAGO
 SIMON, L. S., CHICAGO

SMITH, P. H., EVANSTON
 STEIN, I. F., CHICAGO
 TUCKER, BEATRICE E., CHICAGO
 WHITACRE, F. E., CHICAGO

INDIANA

BECKMAN, H. F., INDIANAPOLIS
 BICKEL, D. A., SOUTH BEND
 GUSTAFSON, G. W., INDIANAPOLIS
 KELLY, J. F., INDIANAPOLIS
 MCCORMICK, C. O., INDIANAPOLIS
 *MENDENHALL, A. M., INDIANAPOLIS
 SMITH, D. L., INDIANAPOLIS
 WALKER, F. C., INDIANAPOLIS

IOWA

BROWN, W. E., CEDAR RAPIDS
 CROWDER, R. E., SIOUX CITY
 MENGERT, W. F., IOWA CITY
 PLASS, E. D., IOWA CITY
 RANDALL, J. H., IOWA CITY
 VON GRAFF, ERWIN, DES MOINES

KANSAS

COWLES, G. E., WICHITA
 WEST, R. A., WICHITA

KENTUCKY

BARRETT, A. B., LEXINGTON
 MCCONNELL, W. T., LOUISVILLE
 SPEIDEL, EDWARD, LOUISVILLE
 STARR, S. H., LOUISVILLE
 WHITEHOUSE, A. J., LEXINGTON

LOUISIANA

KING, E. L., NEW ORLEANS
 KOSTMAYER, H. W., NEW ORLEANS
 LEVY, W. E., NEW ORLEANS
 MILLER, C. J., NEW ORLEANS
 MILLER, H. E., NEW ORLEANS
 SELLERS, T. B., NEW ORLEANS

MAINE

LEIGHTON, A. P., PORTLAND

MARYLAND

BERGLAND, J. MCF., BALTIMORE
 DOUGLASS, L. H., BALTIMORE
 NOVAK, EMIL, BALTIMORE
 ROWLAND, J. M. H., BALTIMORE
 *WILLIAMS, J. W., BALTIMORE

MASSACHUSETTS

ALMY, THOMAS, FALL RIVER
 BERLIN, M. G., BOSTON
 BRISTOL, D. J., JR., BOSTON
 DAVIS, MAX, BOSTON
 DENORMANDIE, R. L., BOSTON
 FINKEL, H. S., BOSTON
 GOETHALS, T. R., BOSTON
 GOOD, F. L., BOSTON
 GWYNNE, S. C., WORCESTER
 HEFFERNAN, R. J., BOSTON
 HUNTINGTON, J. L., BOSTON
 IRVING, F. C., BOSTON
 *JACKSON, D. L., BOSTON
 JANNEY, J. C., BOSTON
 KELLOGG, F. S., BOSTON
 KICKHAM, E. L., BOSTON
 LYNCH, F. J., BOSTON
 MEAKER, S. R., BOSTON
 O'CONNOR, J. W., WORCESTER
 PAINE, A. K., BOSTON
 PEMBERTON, F. A., BOSTON
 PETERSON, REUBEN, DUXBURY
 PHANEUF, L. E., BOSTON
 ROCK, JOHN, BOSTON
 ROSENFELD, H. H., BOSTON
 RUGGLES, E. P., BOSTON
 RUSHMORE, STEPHEN, BOSTON
 SHAY, E. F., FALL RIVER
 SHIPTON, G. M., PITTSFIELD
 SMITH, E. W., BOSTON
 TENNEY, BENJAMIN, JR., BOSTON
 TITUS, R. S., BOSTON

an increased number of bladder and ureteral lesions at higher levels. In these it is often much more difficult to reach them from below than by approaching them from above. In performing a panhysterectomy, the free exposure of the bladder which is usually undertaken at that operation, will illustrate how easy it may be to reach and repair some of these fistulas.

It is advisable to explain to the patient that the repair of a fistula may be exceedingly difficult and may require several different attempts before its closure is effected. Otherwise, she is very likely to become discouraged and resort to some other operator if the first attempt has failed.

When one considers how easily the mechanism of sphincter control can be disturbed, even with perfectly normal anatomic conditions, as for instance, the retention of urine after an operation, one can see how it may be impossible to get an ideal operative result when the bladder is actually diseased. Fortunately, most of these nervous disturbances of vesical control are in the nature of a retention rather than incontinence, the former being far less distressing to the patient, and much more easily dealt with.

DR. DAVID W. TOVEY, NEW YORK, N. Y.—Operating upon a fistula from above in an obese woman is like working at the bottom of a well. By using the Schuehardt incision the fistula is on top and it is not necessary to work through a small opening. There is no need to use the complete incision, but with a modified one there will be easy access to the trouble. It is almost like working in the perineum.

DR. LEWIS F. SMEAD, TOLEDO, OHIO.—I have seen a good many cases of mild incontinence in my female patients in which there was no anatomic disturbance. In fact, many of them are nulliparous patients. The urine is clear and contains no pus. I have found that these patients can be cured in the majority of cases by urethral instillation of silver nitrate of 1 to 2 per cent. They are cases of edema or chronic irritation of the bladder neck.

DR. HENRY SCHMITZ, CHICAGO, ILL.—To render these fistulas accessible through the vagina a uterine dilator is placed through the urethra into the fistula. Thus the fistula can be brought down into the vaginal outlet. Dissection and suturing of the layers are thereby facilitated.

DR. A. J. WINEBRAKE, SCRANTON, PA.—I recently had a patient with a large vesicovaginal fistula that had been operated upon three times unsuccessfully. On inspection of the vagina the bladder was seen to be prolapsed through the opening and the two ureters were spurting urine. What to do was a question. The following technic was used: A fairly heavy rubber balloon was used and the neck of the balloon was pulled through the urethra, leaving the body of the balloon in the bladder. With a little air in the balloon I was able to push the prolapsed bladder back into place. On inspection, after increasing the air in the balloon, I found an opening in the vagina the size of a quarter, and with the red balloon as a background, I was able to make a complete dissection and place the sutures to good advantage, letting the air out of the balloon before the sutures were tied.

There is additional advantage that you can inflate the bladder to a considerable size before operating. This will increase its capacity by breaking up adhesions which have formed in a bladder which has been collapsed for a long period. Your assistant can place pressure on the lower abdomen and you will be surprised how this brings down the opening in the bladder and gives you a splendid exposure. There was primary union in my case and the sutures were removed in six days. This patient retained her urine six hours after removal of the catheter and after one week, she did not have to get up at night. Such a technic gives a beautiful exposure and is a simple procedure.

KIERNAN, J. O'C., ALBANY
 KING, J. E., BUFFALO
 KLEEGMAN, SOPHIA J., NEW YORK
 KLEIN, HYMAN, BROOKLYN
 KNIPE, W. H. W., NEW YORK
 KOSMAK, G. W., NEW YORK
 KRAUSHAR, SAMUEL, BROOKLYN
 LILIENTFELD, M. C. C., NEW YORK
 LOBSENZ, J. M., NEW YORK
 LOBSENZ, MOSES, NEW YORK
 LOCHNER, J. L., JR., ALBANY
 LOIZEAUX, L. S., NEW YORK
 LORBER, HERMAN, NEW YORK
 LUBIN, SAMUEL, BROOKLYN
 LYON, E. C., JR., NEW YORK
 McMAHON, J. J., NEW YORK
 McMANUS, J. P., HOLLIS, L. I.
 *MCPHERSON, ROSS, NEW YORK
 MALLIA, W. M., SCHENECTADY
 MATTHEWS, H. B., BROOKLYN
 MAYES, H. W., BROOKLYN
 MAZZOLLA, V. P., BROOKLYN
 MEAGHER, W. C., BROOKLYN
 MENCKEN, H. P., FLUSHING, L. I.
 MERRIAM, M. S., BROOKLYN
 MILLER, J. A., NEW YORK
 MOENCH, G. L., NEW YORK
 MUELLER, C. W., BROOKLYN
 MURRAY, P. M., NEW YORK
 NEUSTAEDTER, THEODORE, NEW YORK
 O'CONNOR, F. E., KINGSTON
 OGINZ, PHILIP, BROOKLYN
 PEIGHTAL, T. C., NEW YORK
 PHILIP, ALBERT, NEW YORK
 *POLAK, J. O., BROOKLYN
 POLIFKA, KARL, NEW YORK
 POTTER, I. W., BUFFALO
 POTTER, M. G., BUFFALO
 QUIGLEY, J. K., ROCHESTER
 RABBINER, BENJAMIN, BROOKLYN
 RAWLS, R. M., NEW YORK
 REID, GEORGIA, NEW YORK
 RICE, F. W., NEW YORK
 RITCHIE, R. N., ROCHESTER
 ROBINSON, M. R., NEW YORK
 ROGERS, J. F., POUGHKEEPSIE
 RONGY, A. J., NEW YORK
 ROSENBERG, MAXIMILIAN, BROOKLYN
 ROSENFELD, S. S., NEW YORK
 RUBIN, I. C., NEW YORK
 RYDER, G. H., NEW YORK
 SACKETT, N. B., NEW YORK
 SAFFORD, H. B., NEW YORK
 SALZBERG, A. H., BROOKLYN
 SCADRON, S. J., NEW YORK
 SCHNEIDER, MAX, NEW YORK
 SCHOENECK, F. J., SYRACUSE
 SCHOENECK, HENRY, SYRACUSE
 SCHWARTZ, L. S., BROOKLYN
 SEARS, N. P., SYRACUSE
 SHIELDS, FRANCES E., NEW YORK
 SHIR, M. M., BROOKLYN
 SIEGEL, L. A., BUFFALO
 SIEGLER, S. L., BROOKLYN
 SMITH, F. R., NEW YORK
 SMITH, W. S., BROOKLYN
 STANDER, H. J., NEW YORK
 STEIN, ARTHUR, NEW YORK
 *STURMDORF, ARNOLD, NEW YORK
 TAYLOR, H. C., NEW YORK
 TRUX, S. L., MIDDLETOWN
 VAN AUKEN, W. B. D., TROY
 VAN ETTEEN, R. C., NEW YORK
 WARD, G. G., NEW YORK
 WARD, WILBUR, NEW YORK
 WATSON, B. P., NEW YORK
 WEINTRAUB, FREDERICK, BROOKLYN
 WELTON, T. S., BROOKLYN
 WILENS, IRA, NEW YORK
 WILLIAMSON, H. C., NEW YORK
 WILSON, K. M., ROCHESTER
 WILSON, R. A., BROOKLYN
 WIMPFHEIMER, SEYMOUR, NEW YORK
 WING, L. A., NEW YORK
 WINKLER, E. G., BUFFALO
 WOLFE, S. A., BROOKLYN
 WRANA, JOSEPH, GLENDALE, L. I.

NORTH CAROLINA

BRADFORD, W. Z., CHARLOTTE
 HAMBLIN, E. C., DURHAM
 LEE, T. L., KINSTON
 PROCTER, I. M., RALEIGH
 ROSS, R. A., DURHAM

NORTH DAKOTA

FJELDE, J. H., FARGO
 MOORE, J. H., GRAND FORKS

OHIO

ABRAMS, S. B., CLEVELAND
 BARNEY, W. R., CLEVELAND
 BENNETT, A. E., CLEVELAND
 BILL, A. H., CLEVELAND
 *BONIFIELD, C. L., CINCINNATI
 DOUGLASS, M. D., CLEVELAND
 FAULKNER, R. L., CLEVELAND
 FULLERTON, W. D., CLEVELAND
 GARDINER, J. P., TOLEDO
 GOODMAN, S. J., COLUMBUS
 HOERNER, J. K., DAYTON
 KENNEDY, E. P., CLEVELAND
 KRIGBAUM, R. E., COLUMBUS
 McCLENAHAN, H. E., YOUNGSTOWN
 MILLER, THEODORE, CLEVELAND
 MOWRY, F. S., CLEVELAND
 PIERCE, J. M., CINCINNATI
 REYCRRAFT, J. L., CLEVELAND
 ROBISHAW, A. W., CLEVELAND
 ROGERS, ANDREWS, COLUMBUS
 TATE, M. A., CINCINNATI
 WEIR, W. H., CLEVELAND

OKLAHOMA

CHARBONNET, P. N., TULSA

OREGON

ADAMS, T. W., PORTLAND
 DUDMAN, V. E., PORTLAND
 HOLMAN, A. W., PORTLAND
 MATHIEU, ALBERT, PORTLAND
 *McCUSKER, C. J., PORTLAND
 SCHAUFFLER, G. C., PORTLAND
 WATKINS, R. E., PORTLAND

PENNSYLVANIA

ANSPACH, B. M., PHILADELPHIA
 BARNARD, E. P., PHILADELPHIA
 BEHNEY, C. A., PHILADELPHIA
 BIETSCH, C. F., PITTSBURGH
 BLAND, P. B., PHILADELPHIA
 CARROLL, J. H., PITTSBURGH
 CARROLL, T. B., PITTSBURGH
 CHALFANT, S. A., PITTSBURGH
 CLEMMER, LEON, PHILADELPHIA
 CONTI, E. A., PITTSBURGH
 CRAIG, E. B., PHILADELPHIA
 EISAMAN, J. R., PITTSBURGH
 ELY, W. C., PHILADELPHIA
 FISHER, J. M., PHILADELPHIA
 FOULKROD, COLLIN, PHILADELPHIA
 GILLIS, R. A. D., PITTSBURGH
 HAMMOND, F. C., PHILADELPHIA
 HEPP, J. A., PITTSBURGH
 *JAMES, D. B., PHILADELPHIA
 JAMES, J. E., JR., PHILADELPHIA
 KATZ, DAVID, PITTSBURGH
 KEENE, F. E., PHILADELPHIA
 KIMBROUGH, R. A., JR., PHILADELPHIA
 KOCYAN, J. J., WILKES-BARRE
 LAWS, G. M., PHILADELPHIA
 LONGAKER, DANIEL, PHILADELPHIA
 *McCULLOUGH, F. J., PHILADELPHIA
 MACFARLANE, CATHERINE, PHILADELPHIA
 MANN, BERNARD, PHILADELPHIA
 MAZER, CHARLES, PHILADELPHIA
 MILLER, F. A., PHILADELPHIA
 MOHLER, R. W., PHILADELPHIA
 NICHOLSON, W. R., PHILADELPHIA
 NORRIS, C. C., PHILADELPHIA
 PARKE, W. E., PHILADELPHIA
 *PIPER, E. B., PHILADELPHIA
 RAYMOND, W. C., JOHNSTOWN

THE REDUCTION OF MORTALITY IN ECTOPIC GESTATION*

CHARLES A. GORDON, M.D., F.A.C.S., BROOKLYN, N. Y.

MORE than fifty years have elapsed since Lawson Tait¹ first operated upon a patient with a diagnosis of ectopic rupture. Only eight years later Sehauta² in 1891 demonstrated that prompt operation had reduced mortality from 86.9 to 5.7 per cent. When Hunter Robb,^{3, 4} nearly thirty years ago, showed that both uterine and ovarian arteries and veins might be severed without killing experimental animals, he for a while stemmed the tide of immediate operation which by then had become general practice. The mortality of the expert operators of his day, he said, was 40 to 50 per cent in patients in shock. He was convinced that many patients lost their lives from the operation alone, that only very rarely, possibly never, could a patient be saved by operation when the blood loss itself was sufficient to cause death. He taught that death was due to shock, fresh hemorrhage, to manipulation, and relief of abdominal tension by laparotomy; the sudden removal of a large quantity of blood before the vessels had time to become adjusted to altered conditions was dangerous.

Robb's views were never generally accepted. Although many of his views have not been properly refuted, the bitter controversy raised by him has for the most part been forgotten. Death is due to hemorrhage, not shock, yet the statistics of those who await reaction compare very favorably with the results of immediate operation. Many gynecologists rarely lose a patient. It is, I believe, generally held that the mortality of ectopic gestation is well under control, but is it? What are the facts?

Recent publications of maternal mortality statistics show a surprising number of deaths due to ectopic gestation. It seems that the mortality is formidable enough. The New York Academy of Medicine⁵ report on New York City for 1930 to 1933 listed 120 deaths from ectopic gestation, 5.9 per cent of the total maternal mortality. The Philadelphia⁶ report considering 717 maternal deaths for 1931 to 1933 reported 33 ectopic deaths, 4.6 per cent of the total, or 11 per cent of the cases under twenty-eight weeks. The Children's Bureau *Study of Maternal Mortality in Fifteen States*⁷ for 1927 and 1928 in 13 states, and for 1928 only in 2 more states, attributed 314 deaths to ectopic gestation, or 4 per cent of the total 7,380; deaths from hemorrhage of placenta previa were but 347, and deaths from postpartum hemorrhage 374.

*Read at the Forty-Eighth Annual Meeting of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons held at Skytop, Pa., September 16 to 18, 1935.

American Journal of Obstetrics and Gynecology

VOL. 31

FEBRUARY, 1936

No. 2

American Association of Obstetricians, Gynecologists
and Abdominal Surgeons

A BRIEF HISTORY OF OBSTETRICS AND GYNECOLOGY IN VIRGINIA*

PRESIDENTIAL ADDRESS

M. P. RUCKER, M.D., RICHMOND, VA.

OBSTETRICS and gynecology developed in Virginia much as it did elsewhere. The history of this branch of medicine in Virginia serves as a cross-section, the longest cross-section to be sure, of the history of obstetrics and gynecology in the country as a whole. It affords a beautiful example of the reaction of trained men to frontier conditions.

When the first colonists landed at Jamestown in 1607, they brought with them English ideas and English customs. They built homes and gardens as nearly like those in England as circumstances would permit. They imported their fashions and their furniture from England and named the colony after England's great Virgin Queen. Herbert Spencer, in his *Medicine in the Days of Shakespeare*, has given us a good picture of the medicine of those times. Its practice was divided by law and custom between the physician, the surgeon, the apothecary, and the midwife. The physician was usually an aristocrat and a man of learning. He had been educated at one of the old universities and had made the "grand tour" and studied in, or at least visited, the continental medical schools at Paris, Montpellier, Leyden, or Padua. It was easier for a butcher's boy to become a cardinal or a dramatist than a physician. With his classical education, speaking and writing Latin and for the

*Presented at the Forty-Eighth Annual Meeting of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons, Skytop, Pa., September 16 to 18, 1935.

For lack of space this address cannot be printed here in full, but may be found in its complete form in the current volume of the Association's Transactions.

NOTE: The Editor accepts no responsibility for the views and statements of authors as published in their "Original Communications."

condition of the patient permits. Sellers and Sanders, and Echols had no mortality at all, yet the mortality of others who practice the same prompt operation is high. Fitzgerald and Brewer reporting the largest

TABLE II

	NO. OF CASES	DEATHS	PER CENT MORTALITY	PER CENT CORRECT
Baens ⁹	174	15	8.6	68.0
Behney ¹⁰	167	3	1.8	61.3
Willis ¹¹	104	4	3.8	62.0
Curran and Goodale ¹²	108	6	4.6	—
Echols ¹³	103	0	0.0	70.80
Fitzgerald and Brewer ¹⁴	500	39	7.8	60.4
Gordon ¹⁵	120	2	1.7	87.0
Hendry ¹⁶	152	9	5.9	79.6
James and Lafferty ¹⁷	103	3	2.91	74.0
Masson ¹⁸	471	8	1.8	—
Meagher ¹⁹	247	8	3.2	90.0
Ricci and DiPalma ²⁰	100	9	9.0	89.0
Sellers and Sanders ²¹	211	0	0.0	75.0
Tyrone, Romano and Collins ²²	309	36	11.6	51.5
Urdan ²³	474	14	2.95	71.7
Total	3,343	156	4.6	

number of cases, including 91 patients in collapse, show approximately the same mortality for deferred and immediate operation, 33 to 34 per cent. Obviously there are other important factors—the preparation of the patient for operation, and the conduct of the operation itself.

DIAGNOSIS

It is clear that reduction of the mortality of ectopic gestations depends more upon early recognition than upon treatment. In most fatal cases symptoms were present for considerable time before operation was done. Either these symptoms were ignored by the patient or disregarded by the physician. Women should be warned of the possible significance of delayed menses and pain whether associated with vaginal bleeding or not.

It still is stated in textbooks and elsewhere that the diagnosis of ruptured ectopic pregnancies is especially difficult, whereas it should not be. The well-trained general practitioner usually makes the diagnosis, and often he is in an excellent position to do so since onset symptoms are characteristic but fleeting. The symptom complex and the physical signs are definite, and the diagnosis should be made as often as in acute appendicitis, where the physician feels that he should make few mistakes, although acute appendicitis may be just as atypical as ectopic gestation.

It is not necessary to discuss all the symptoms. That it is more common in multiparas and in women with a laparotomy scar is well known. Bleeding with unilateral pelvic soreness or pain, usually moderate, sudden but not dramatic, shoulder pain, syncope or momentary faint-

ovariotomy; the first "Dührssen" incisions (before Dührssen was born); the first cure of vesicovaginal fistula; the first metallic sutures; the first immediate repair of the cervix (by the son of a Virginian); the first episiotomy; the first description of puerperal malarial fever, etc. These are no doubt well known to you and are beside my purpose to-day. Rather would I trace as best I can the kind of obstetrics and gynecology practiced in Virginia from time to time.

For the purpose of description it is convenient to divide the period into two parts, before and after the advent of the man midwife. This took place in Virginia about 1750. A third division suggests itself, that after the advent of the specialist, but as all the Virginia specialists in this field, save one, are still alive, such a section would not properly come under the head of history. According to Blanton, the first evidence of a man midwife was in 1753 when it is recorded that Henrico County paid Gearrard Ellyson one pound for midwifery services. The first medical fee bill makes no mention of obstetrics in 1736.

Our sources of information in the first period are rather meager; chiefly court records, vestry records, and the writings of such men as Colonel William Byrd and Thomas Jefferson. Both were voluminous writers and keen observers. Thomas Jefferson is said to have invented an incubator. Both were interested in sterility. Colonel Byrd records that when an Indian woman does not conceive within a reasonable time after marriage, the husband, to save his reputation, enters into a diet for six weeks. The remedy rarely failed. I imagine this is the first reference to a high protein diet in sterility.

The midwives received various fees. Twelve hens were paid the Widow Hollins (although she sued for eighteen) in 1634. Goodwife Thorpe charged 100 pounds of tobacco. The midwives took care of all the obstetrics in the Colony. It was early the custom for doctors to take into their homes one or two patients. The Surry County Records, for instance, show that George Lee rather reluctantly took Mrs. Richard Hill into his home during her pregnancy, which seemed to have been a complicated one, and also treated her husband, but when she was confined she was attended by two midwives, assisted by two nurses and other women. This practice of hospitalizing patients in physicians' homes may have been the reason why William Baynham, who was the foremost anatomist and next to Physick the leading surgeon in America, remained in Essex County. Several generations later John P. Mettauer developed the idea to such an extent that he filled a little country town with surgical patients and finally established a medical school there.

But to go back to the midwives, not only did they have exclusive control of obstetrics, but the courts also appointed juries of midwives to pass on the question of pregnancy in condemned females. Nor were their activities confined to obstetrics and legal opinions; in 1766, Constant Woodson presented to the House of Burgesses a petition setting forth that she had discovered an effectual remedy for curing cancer which she "for a valuable consideration will communicate to the publick." The

Crossen³⁶ advises immediate section if the patient is within reach of an experienced abdominal surgeon and can be placed in suitable surroundings, otherwise operation is best deferred. He says that "The marked emphasis which teachers and writers generally have placed upon promptness of operation has unfortunately led to considerable indiscriminate operating. These desperate cases where the vital forces are at a low ebb require much judgment and discrimination as to when to operate . . . on the one hand to stop the bleeding, and thus prevent the patient from passing into an absolutely hopeless condition, and on the other hand, to avoid snuffing out the little spark of life remaining by the added strain of intraperitoneal manipulation and anesthesia."

Goodall³⁷ says there is no fixed rule; but he advises immediate operation and transfusion as soon as ligation has been effected.

Litzenberg^{38, 39} advises ligation as soon as the patient's condition will permit. "However," he says, "the patient is sometimes in such grave condition that to do an immediate laparotomy would be only inviting death." The advantage of transfusion just before operation has made him an advocate of immediate operation with rapid preparations under ideal conditions.

C. Jeff Miller⁴⁰ unqualifiedly in favor of immediate operation says that the late J. O. Polak was almost the only authority of consequence to advocate delayed operation.

Since the margin of reserve is so narrow in many of these cases, it is clear that support of the patient is of the utmost importance, no matter when operation is done, yet this phase of treatment often receives but scant attention, nor is the actual management of the operation agreed upon. The importance of transfusion, easily our most valuable asset, is not stressed as specific in the treatment of hemorrhage, nor do our teachers agree as to when it should be done, most authorities advising that it be carried out after operation, probably because they fear it will be lost in the abdomen or may cause recurrence of bleeding, yet when ready to operate is the logical time for it, whether the patient is bleeding actively or not.

Some remove the blood and clots in the abdomen, washing out with saline, while others remove only the clots. Autotransfusion is approved, although it is known to be dangerous and deaths have been reported from it. The best anesthetic for operation is still unknown. Whether diagnostic colpotomy should be practiced is highly doubtful. The value of hypodermoclysis and stimulation and intravenous gum salt solution and glucose should be studied; some have found acacia dangerous. The absolute importance of perfect technic should be stressed, and multiple operations, particularly appendectomy, condemned. Certainly sufficient time has elapsed to warrant definite recommendations.

COMMENT

All patients should be operated upon although some may get well otherwise. Whether intraperitoneal rupture is more common than tubal abortion, better called intratubal rupture, makes very little difference; some however try to differentiate because in one, hemorrhage usually

stressed the importance of early operation. He discussed the question of uterine suture and anesthesia and left these questions open. Sanger, in his classical monograph in 1882, recognized the importance of uterine suture as well as early operation, and in support of his thesis he gives a table of the sixteen American operations in which sutures had been used in the uterus. Interestingly enough the earliest of these was performed by a country charlatan in Virginia whose name is unknown (Harris, *Am. J. Obst.* 11:620, 1879). It is reported by Weems who witnessed the operation. Other early Virginia cesarean operations are by Brodie S. Herndon in 1845, William G. Smith in 1855, Charles Mills in 1856 and 1867 upon the same patient, and by Edward Drew in 1856, James Parrish in 1875, and by J. T. Boutelle in 1879 and 1880.

It is said that Drelineourt, the teacher of the celebrated Boerhaave, enumerated nearly 300 theories of conception, all of which were believed at one time or another. None of these seemed to have bothered Virginia doctors.

* * *

While they were not much on theory, the Virginia doctors were strong on therapy. John P. Mettauer reported in great detail a case of puerperal fever successfully treated. He was seemingly proud of his prophylactic treatment of puerperal fever for he wrote a number of articles on it. It consisted of (1) purgation a few hours after delivery. Some diuretic such as an infusion of pine tops was also considered useful. The diet, of course, should be restricted. (2) Purging more remotely after delivery. (3) Purging in all cases after delivery. This treatment, however, was not universally accepted.

* * *

An epidemic of puerperal fever that occurred in Mount Solon and vicinity was reported by C. R. Harris in 1852. More than three-fourths of those delivered were attacked. Of the thirty-six patients, seven died. There was one autopsy. The author, nevertheless, did not believe in the contagiousness of the disease.

In 1885 the germ theory, as it was called, had come to the front. I. S. Stone reported a good result in treating a case of puerperal septicemia with intrauterine injections of bichloride of mercury solution 1-500. In the same journal, M. A. Rust had an excellent article on the evolution of antiseptic midwifery. He quoted from the Prussian statistics to show that three-fourths of maternal deaths were due to sepsis, or 1 in 40 confinements. He advised against intrauterine injections, and called attention to fatal cases of bichloride poisoning from that cause. He condemned the routine exploration of the uterine cavity with the hand. He recommended bichloride compresses to the vulva to prevent air from entering the uterus. Walter Izard described a safe method of injecting the uterine cavity, using potassium permanganate solution and a two-way nozzle.

perieneced assistants. Unqualified endorsement of immediate operation is unfortunate. The facts do not warrant it since excellent results have been obtained otherwise.

Individual experience and definite convictions may lead to misconceptions. There is no objection to continuing the practice of years if one is satisfied with his own results. Possibly it makes very little difference which plan of treatment is followed by those who operate quickly, fortifying the patient by transfusion. The surgeon and the general practitioner who so often operate themselves are an important part of the problem.

SUMMARY

The impression that the mortality of ectopic gestation is well under control is erroneous. Nearly 6 per cent of the maternal mortality of the City of New York is due to ectopic gestation; equally high figures, with a large percentage of deaths due to sepsis, and many patients never operated upon at all, are reported elsewhere. Even gynecologists have published inconsistent results. The outstanding fact is failure of diagnosis.

Our textbooks disagree on treatment and for the most part fail to emphasize and discuss thoroughly the importance and value of supportive treatment. It should be possible to rationalize teaching at least. It should not be said repeatedly that diagnosis is especially difficult, nor should it be unqualifiedly stated that every patient should be operated upon at once no matter what her condition, no matter who may be the operator.

In the presence of intraperitoneal blood only the simplest operative procedure should be carried out. It is perfectly proper and wise to defer operation in many serious cases, not indefinitely, but until transfusion and other supportive treatment lessen the risk of operation.

A comprehensive survey of the whole problem should be undertaken.

REFERENCES

- (1) *Tait, Lawson*: Lectures on Ectopic Pregnancy and Pelvic Hematocele, Birmingham, 1888.
- (2) *Schantz, F.*: Beiträge zur Kasuistik, Prognose, und Therapie der Extrauterinschwangerschaft, Prague, J. G. Calvé, 1891.
- (3) *Robb, Hunter*: Am. J. Obst. 58: 577, 1908.
- (4) *Robb, Hunter*: Tr. Am. Gynec. Soc. 32: 373, 1907.
- (5) New York Acad. Med.: Maternal Mortality in New York City, 1930-32, Oxford University Press, London, 1933.
- (6) Committee on Maternal Welfare: Maternal Mortality in Philadelphia, 1931-33, Philadelphia County Medical Society, 1934.
- (7) Maternal Mortality in Fifteen States, United States Department of Labor, Children's Bureau Publication No. 223, Washington, 1934.
- (8) *Litzenberg, Jennings C.*: Davis, Gynecology and Obstetrics 1: Hagerstown, 1934.
- (9) *W. F. Prior Co., Inc.*, chap. 11, p. 12.
- (10) *Baens, A.*: J. Philippine Islands M. A. 12: 497, 1932.
- (11) *Behney, Charles A.*: J. A. M. A. 95: 1557, 1930.
- (12) *Willis, Byrd Charles W.*: South. M. & S. 94: 206, 1932.
- (13) *Curran, John F., and Goodale, Raymond H.*: New England J. Med. 209: 189, 1933.
- (14) *Echols, Chester M.*: J. A. M. A. 103: 1686, 1934.
- (15) *Fitzgerald, James E., and Brewer, John I.*: Am. J. Obst. & Gynec. 30: 264, 1935.
- (16) *Gordon, Charles A.*: Am. J. Surg. 3: 456, 1927.
- (17) *Hendry, W. B.*: Am. J. Obst. & Gynec. 10: 386, 1925.
- (18) *James, John E., Jr., and Lafferty, Henry*: Am. J. Obst. & Gynec. 29: 711, 1935.
- (19) *Masson,*

Leigh reported a case of four years' standing. The patient died of heart disease and at autopsy fetal bones were found in a sac formed by the omentum. George William Semple reported a case in which the diagnosis of metritis was made. The patient passed a uterine cast and was treated for worms (which she had). The extrauterine fetation was diagnosed at autopsy. Hunter McGuire reported a case of missed labor with subsequent pregnancy. The previous tumor then suppurated and fetal bones were discharged per vaginam. He opened the abdomen and removed what was left of a nine months' fetus. The patient died in a week. John Lewis removed the remains of a fetus per anum. Walter Izard successfully operated upon a case of abdominal pregnancy of four years' duration. There was a fistula at the umbilicus. J. R. Godwin had a case with a fecal fistula at the navel and another fistula two inches below and to the left, through which he removed the fetal bones. The patient recovered. Samuel also removed a decomposed fetus from the rectum.

In the *Boston Medical and Surgical Journal* (1840), John P. Mettauer reported a case of vesicovaginal fistula upon which he operated successfully in 1838. Seven years later, he reported two cases in detail and four others, and is convinced "that every case of vesicovaginal fistula can be cured and my success justifies the statement." He used sutures of lead wire. Later he modified this statement as to all cases being curable as he found two in 32 inoperable.

Vesicovaginal fistula came to the front in Virginia medical literature again after the Civil War. Naturally nothing was written on obstetrics and gynecology from 1861 to 1865. The only case of military gynecology is reported in 1867. A young lady was wounded in March, 1865, by a pistol ball, which entered the thigh and passed through the bladder and abdomen. The wound healed with the exception of a vesicovaginal fistula. Fisher of Warrenton operated but was unsuccessful. He took the patient to Emmet who succeeded on the fourth attempt. All save the second operation were done without an anesthetic.

The treatment of eclampsia did not change as quickly and as much as it does today. In 1851, Thomas Pollard reported three cases with one recovery. His treatment consisted of cold to the head, blisters to the nucha, bloodletting, cupping, enemas, and purgatives. "On the use of opium there is some contrariety of opinion." He made the suggestion that chloroform might be useful. If the convulsions do not stop the uterus should be emptied. Veratrum viride made its appearance about 1874 (McCaw, Coleman, Tebault) and shortly afterward chloral hydrate (Harmanson). In 1882 accouchement forcé was first mentioned, Dr. Charles R. Cullen reporting a fatal case. He regretted that he had no instrument with which to dilate the cervix more rapidly.

Dystocia was most frequently due to malpositions. A surprising number of twins with locked heads were reported and several cases of uterine tumors. The cervix gave Virginia doctors a lot of trouble. The rigid

pelvic or abdominal cavities. Such masses are often mistaken for ovarian cysts and occasionally for fibroids. Since there is no delay in operation, error in diagnosis does not jeopardize the patient.

In the last group of ectopic pregnancies the clinical picture is always critical. Amenorrhea has persisted for several weeks or even several months. There is abrupt pain followed by collapse. Diagnosis is easy but treatment requires careful judgment.

A conservative plan was formulated by the late Dr. John O. Polak in the preparation of the critical case for operation. The Trendelenburg position was employed and external heat, morphine and hypodermoclysis were administered. When the systolic pressure returned to 100 mm. of mercury and the pulse had fallen to about 100, operation was begun. The donor, matched in the interim, was ready for the transfusion as soon as the mesosalpinx was secured.

It is possible that patients may die from shock and hemorrhage under this expectant regime, for the isthmic segment of the tube contains large arteries and veins which may continue to bleed in spite of the low blood pressure, morphine, and rest. A fatal outcome can be avoided by limiting the period of expectant observation to one hour. Nothing is lost for in this interval operating room and donor are made ready. If the patient is improving at the end of the stated hour the Polak technic is followed; while if there is no improvement as judged by continued low blood pressure and rapid pulse rate, operation follows. Transfusion under these circumstances should begin with the abdominal incision for little blood will be lost from the gaping vessels with the blood pressure so low. A second transfusion may be given later if necessary.

DR. W. WAYNE BABCOCK, PHILADELPHIA, PA.—Thirty years ago after a death from the abdominal operation for ectopic pregnancy, I decided that an important factor was the added shock due to peritoneal exposure and traumatism. As a result, for the last thirty years I have operated in all of these tragic cases by the vaginal route. It is a simple operation. The cervix is pulled down and forward by a tenaculum forceps, a puncture made by curved scissors through the culdesac, two fingers inserted and the opening enlarged by traction. The large fallopian tube is located by the fingers and drawn down into the vagina. Sometimes adhesions prevent this being done easily, when ring forceps may be introduced, the tube grasped and pulled down as the adhesions are brushed aside. If the patient is pulseless a clamp is put on the tube proximal to the enlargement, a gauze drain introduced into the culdesac and the patient returned to bed. The blood escapes spontaneously from the peritoneal cavity without sponging or irrigation. In most cases the patient is not in such critical condition and a few minutes more may be used while a ligature is tied around the tube and the enlarged portion cut away.

In no case is the operation to be delayed. Why should one delay when by such a simple procedure the bleeding may be positively arrested within five minutes? To one familiar with the technic of vaginal section the operation requires little more time than that for an exploratory puncture into the culdesac. The only death which has followed this operation in our hands was due to pneumonia and occurred three weeks after the vaginal section.

DR. NATHAN P. SEARS, SYRACUSE, N. Y.—The first point I wish to emphasize is that if we can train our students to be careful and to keep in mind ectopic pregnancy whenever irregular bleeding and pelvic pain are present, is that many cases of ectopic gestation will be recognized before they become tragic. When I see a patient with the complaint of some recent or sudden changes in menstruation with or without pain and I can elicit tenderness or a mass in one side of the pelvis, I immediately send her to the hospital and keep her under observation until I can

ton to show that as the incidence of forceps operations increased and the duration of labor decreased, there was a proportionate lowering of fetal and maternal mortality. The subject was also discussed by E. M. Campbell and Thomas J. Moore.

Retained placenta was reported six times, five times after full-term labors and once after an abortion. According to Dr. L. Faulkner if the placenta cannot be delivered you had better leave it to nature. "It is better to ground arms in proper time, and see that nature has a fair chance." George S. Minor evidently did not give nature a fair chance for his patient died on the thirteenth day of "irritative fever." P. W. Harper had better luck. He saw his patient twelve hours after delivery. There was an hour-glass contraction of the uterus and neither he nor his consultant could deliver the placenta. On the second day the patient began to run a fever and on the fourth day began to expel portions of the placenta. On the tenth day the last portion of the placenta was expelled. On the twenty-first day the patient was free from fever. On the twenty-third day she developed a phlebitis in the right thigh and leg which yielded in six days to purging, bleeding, and external applications of saturnine solution. The swelling and concomitant symptoms then visited the left thigh and leg, but yielded to the same plan of treatment.

Between 1859 and 1880 five cases of ruptured uterus and one case of ruptured vagina with the escape of the fetus into the peritoneal cavity were reported. In one case it was stated that ergot had not been used. Preston described a new sign, one that was first described by M. Jolly, a subperitoneal swelling that appeared either above the pubes, in the groin, or in the vagina. Fontaine's description of his case shows us what a country doctor had to contend with. He found the patient in extremis. There was no time for consultation, very little time for consideration. With the willing assistance of two women he did a craniotomy and finally extracted the child. He then "went after" the placenta and found that it was partly in the abdominal cavity. He delivered it manually. He then found a rectovaginal fistula. He looked up the bowels for a week with opium. The patient recovered and the fistula healed.

A discussion of breast conditions falls into three classes: (1) complications of the puerperium, (2) tumors, and (3) interrelationship of the breasts and pelvic conditions. J. B. McCaw praised belladonna as an antigalactic, and James the fluid extract of the leaves of the castor oil plant as a galactagogue. Macon was full of praise of *Phytolacca decandra* in arresting threatened mammary abscess. Iodine ointment was recommended for the same purpose. The use of adhesive plaster in chronic mammary abscess was described by McGuire. Hooker wrote that much of the discomfort incident to lying-in women may be avoided by regular meals of solid food with an avoidance of a free use of drinks.

DR. F. S. WETHERELL, SYRACUSE, N. Y.—The use of the sphygmomanometer in these cases must be stressed. Recently a patient was brought to the hospital and the surgeon said, "We will wait because Polak has advised waiting." The systolic pressure of the patient was 80. It came back to 120 at eight o'clock in the evening. At twelve o'clock the interne notified the surgeon that the blood pressure was now 60 systolic. A half hour later the patient was dead. Repeated blood pressure recordings, quarter hourly, should therefore be the rule.

Operation, plus transfusion, as *the blood pressure approaches normal*, will lower death rate in ectopic pregnancy. The surgeon, whether he operates by the vaginal or the abdominal route, who takes longer than ten or fifteen minutes to perform the operation, will lose patients who can be saved. Stopping to fondle the internal organs, and often to take out blood clots, suck out blood and the like, is not good surgery.

DR. JAMES E. DAVIS, ANN ARBOR, MICH.—There is a silent symptom group the frequency of which should be better known. If the pathologist will split the tube from the proximal to the distal end and then wash out anything from the lumen with hot water, he will be able to select the proper area for section and make a diagnosis in some of these silent cases. Otherwise they will not get into the statistics at all.

DR. GORDON (closing).—I had thought that my paper was the paper of an heretic, but in the discussion no one has taken issue with me on the point that immediate operation is not to be advised. Personally I do not believe in posterior colpotomy nor in examination under anesthesia. We all disagree on these minor things, and yet I have shown that the mortality in the last thirty-five or forty years is no different from that reported by Schauta. Investigation should show whether we should wash out the blood or leave it in, and whether to give salt or gum acacia, and whether to transfuse or not.

INTRASPINAL ALCOHOL INJECTIONS AND SYMPLECTOMY FOR PAIN ASSOCIATED WITH CARCINOMA OF THE CERVIX*

A COMPARISON IN EIGHTY CASES

J. P. GREENHILL, M.D., AND HERBERT E. SCHMITZ, M.D., CHICAGO, ILL.
(From the Loyola University Medical School and the Cook County Hospital)

EACH year we see a large number of women with advanced carcinoma of the cervix, and notwithstanding the thoroughness of any form of treatment, about four out every five of these women die of the disease. Practically all of the women with Group III and Group IV carcinoma of the cervix develop severe pain in the lower abdomen, lower back, or down the legs. The pain is due to involvement of the sensory nerves in the malignant process, and at present there are three means of combating this pain other than direct treatment of the malignancy. The

*Read at the Forty-Eighth Annual Meeting of the American Association of Obstetricians, Gynecologists, and Abdominal Surgeons, Skytop, Pa., September 16 to 18, 1935.

cases of procidentia were reported by Herbert Claiborne, Thomas D. Hunter, and F. B. Watkins. J. F. Peebles reported a remarkable ease of prolapse of right ovary with retroversion, prolapsus in the first degree, hypertrophy with granular disease of the cervix, leucorrhea, general ill health, sterility for seven years, recovery and subsequent conception, elevatio uteri.

Time does not permit me to even name the various remedies and modes of treatment that were used. The outstanding work in his field was the successful removal of the cervix in a seirrhous state in 1828 by John Strachan.

A long chapter could be written upon menstrual disorders. In 1824 the best remedy for amenorrhea, according to John Fisher, was the application of leeches to the pudenda. Uterine bleeding in a girl fourteen years stopped promptly when Twyman removed impacted feces from the rectum. Equally surprising result was obtained by Claiborn in a case of menorrhagia, when he dilated the cervix with a tent for the purpose of exploring the uterine cavity. But I will not burden you with such out-of-date matters in this day of endocrine therapy.

A great many cases of ovarian and uterine tumors were reported. In 1828 William McDowell reported a novel method for removal of a polyp. In his case the tumor measured seventeen inches in circumference and was attached to the fundus. In order to get at its base he inverted the uterus, which he repositied after the polypus had been removed. This method was afterward used by Professor Maisonneuve of Paris who reported the method as original with him.

Hematuria, cystitis, vaginismus, sterility, hydrocephalus, hydramnion were seldom mentioned in the Virginia literature. On the other hand, a whole museum of monstrosities were reported. Under the title of hemorrhage from the umbilicus, George A. Otis, who is remembered for his *Medical and Surgical History of the War of the Rebellion*, gave an excellent description of hemorrhagic disease of the newborn and of his efforts to stop the bleeding in a fatal case.

Of necessity this presentation has been extremely sketchy. Any one of the subdivisions would have served for an address. I have been forced to leave out whole chapters such as anesthesia, the speculum, and nervous and mental complications. It has been a great pleasure to meet these old Virginia doctors in the pages of medical literature and to know something of their work. They impress one as being an earnest, conscientious, hard-working lot, who were more concerned about their patients' welfare than their own reputations. When viewed from the vantage point of 1935, some of the things they did seem foolish, but one can but wonder if what we do today will appear less foolish in 1999.

In conclusion, I wish to pay my respects to the Virginia woman. My reading has tremendously increased my admiration for her. We ought to have more monuments to our Jane Crawfords.

TECHNIC OF PELVIC SYMPATHECTOMY

Since many patients who should be subjected to this type of operation are poor surgical risks it is best to open the abdomen under direct infiltration anesthesia. This is a very simple procedure and requires only a few minutes. The rest of the operation may readily be performed under a short ethylene or ether anesthesia or even under infiltration anesthesia. The patient should be placed in the Trendelenburg position after a midline incision has been made from the umbilicus downward toward the pubis for about 10 to 12 cm. After the peritoneal cavity is opened the small intestines are packed off and the sigmoid and rectum are pushed to the left side and held there with a wide retractor. The uterus, adnexa, and bladder may then readily be inspected and palpated to determine the extent of the malignant infiltration. We may also detect a complication such as pus tubes which can be remedied by a surgical procedure. The region of the lower two lumbar vertebrae and the upper part of the sacrum is exposed to view. In thin women, it is possible in some cases to see the presacral nerve immediately beneath the peritoneum. Whether or not the nerve is seen, the parietal peritoneum above and in the middle of the sacral promontory is elevated and incised with scissors. This incision is extended upward for about 4 or 5 cm. and for a similar distance down along the sacrum. When the peritoneal flaps are pulled aside, a fibrocellular connective tissue layer will be exposed covered by more or less adipose tissue. This tissue can easily be separated from the peritoneum and the lower end of the aorta without danger. It is in this layer that the presacral nerve lies. With an aneurysm needle the tissue is elevated at the bifurcation of the aorta and the dissection is carried to a still higher level. As this is done it will be found that in most instances the tissue spreads out in a triangular manner. The middle sacral artery should be pushed away from the nerve, but if it is injured, it can readily be ligated. After the dissection is carried as high as it is desirable to go, the layer of nerve tissue is separated from the underlying tissue down past the sacral promontory into the pelvic cavity. In this region the plexus has divided into the two hypogastric nerves, hence it is necessary to dissect one of these nerves at a time. At least 2 or 3 cm. of each hypogastric nerve should be resected in addition to four or more centimeters of the superior hypogastric and the intermesenteric plexuses. The fibrous tissue layer which contains the hypogastric nerves is much more resistant than that which contains the presacral nerve. As the dissection is carried out, nerve filaments projecting outward will be encountered. These should be followed as far laterally as possible before cutting them. In most instances ganglia will be included in the resection. The dissected tissue should preferably be removed in one piece. It is not necessary or advisable to ligate the presacral nerve or the hypogastric nerves before cutting them, because the only blood vessels in intimate contact with them are insignificant vasa nervosum. In fact Cotte is of the opinion that ligatures may be the origin of secondary pains. Very rarely is bleeding encountered which requires more than simple temporary pressure to check it. (Where the mesosigmoid is very short, care must be exercised to avoid injury to the inferior mesenteric vessels.) After the nerve is resected, the posterior parietal peritoneum is sutured with plain catgut and the abdominal wall is closed in the customary way. Since women with inoperable carcinoma are usually cachectic and prone to exhibit poor wound healing, it is advisable to use silkworm gut or other permanent suture material to aid in the closure of the abdominal wall.

TECHNIC OF INTRASPINAL (SUBARACHNOID) INJECTION OF ALCOHOL

No preliminary medication is given since we wish to observe the immediate effects of the injection. Most patients with advanced carcinoma of the cervix and other genital organs have much more pain on one side than on the other. The patient is placed on the side opposite to that where most of the pain is present. A pillow or pad is placed under her pelvis and side to elevate the sacral and lumbar

upon a common interpretation of the main clinical data, it is vain to expect any comparability as between the maternal rates of the different countries.

It is true that the social and legislative conditions may so vary in different states as to impede attempts at uniformity of treatment. Further, it is true that the rules set up for statistical tabulation by any country are determined by the necessity of presenting the responsible officials with a scheme by which they can, with the maximum of ease and certainty, carry out a selective choice in those instances in which two or more causes of death appear on the certificate. To this must be added the fact that despite repeated international efforts no scheme capable of common acceptance has been devised, with the result that each country has its own more or less arbitrary code. Some countries, the United States in particular, have attempted to secure uniformity by the setting up of detailed international rules for the selective treatment of joint causes, and it would seem feasible to expect that in this way an approximation to comparability should be attainable at least in regard to countries of an equal scale of civilization. Other countries, such as England, with the object of emphasizing reliance of certification and assignment rather than comparability, stress the importance of eliciting the opinion of the certifying doctor and restrict the use of the arbitrary rules to those cases in which such an opinion is either not forthcoming or is unreliable. There are other differences of less significance, such as variations in the definition of a "live birth," which militate against statistical uniformity.

It is unfortunate that the profound discrepancies existing between their methods of tabulation often make it unsafe to attempt to draw from the death rates useful conclusions regarding the obstetric practices and the large scale obstetric experiments of the different nations. In an effort to measure the extent to which the national rates are affected by the varying assignment procedures which we have mentioned, the Bureau of the Census of the United States transmitted a representative group of death certificates relating to the year 1927 to 16 foreign countries and from the corresponding officials in charge of vital statistics obtained for each certificate a statement indicating the assignment procedure to which it would be subjected in accordance with the practice of their respective countries.⁵ This test revealed the existence of a divergence which was often considerable. Thus, for example, it was computed that the official maternal death rate of the United States was thereby increased by 15.3 per cent as compared with Sweden, and by 11.3 per cent as compared with France, while it was decreased by 5.7 per cent as compared with Denmark.

A formal address is not a suitable medium for the presentation of statistical tables, and I have refrained from wearying you with figures except so far as these are necessary to the main theme. It is becoming

ANALYSIS OF RESULTS

In this paper we have attempted to analyze our results with both sympathectomy and alcohol injections. For this purpose we selected our first 40 sympathectomies and our first 40 alcohol injections. All of the 80 women had Group III or Group IV carcinoma of the cervix when they first came under observation.

PELVIC SYMPATHECTOMY

All of the 40 women who had a sympathectomy had Group IV carcinoma. Fifteen (37.5 per cent) obtained complete relief, 14 (35 per cent) were partially relieved, and 11 (27.5 per cent) were not relieved at all by the sympathectomy. Of the 15 women who were completely relieved of their pain, the relief has lasted from two to twelve months. Two of these 15 women are alive twelve months after the operation and are still free from pain. Among the 14 patients who were partially relieved, the pain was absent in some women for a period varying from one to five months after the sympathectomy, and then there was a recurrence of the pain. In other women we considered the result a partial success because only certain types of their pain were relieved but not all.

During the early months of experimentation with pelvic sympathectomy, we chose the patients most sick, and we did not discriminate between the various types of pain. We soon learned from our failures that sympathectomy could not be used to relieve all types of pain associated with carcinoma of the cervix. We found that the women who could be relieved promptly and perhaps for the duration of their lives were those who have pain in the middle of the lower abdomen, pain low in the back, rectal tenesmus, bladder pain and pain associated with vesicovaginal and rectovaginal fistulas. The women who cannot be helped much by sympathectomy are those who have pain in the sacrum due to fixation of the parametrium, pain referred from the region of the sacroiliac joint into the thigh posteriorly and laterally, pain down the anterior surface of the thigh due to involvement of the glands in the obturator canal and pain due to hydronephrosis and hydroureter. If we perform a sympathectomy on all women whose pain is due to carcinoma of the cervix, we cannot give complete or partial relief to more than half of them.

In this series of 40 sympathectomies there were 6 deaths within thirty days after the operation. However, 4 of the 6 women were relieved of their pain by the operation. Three of the patients were among the first few to be operated upon and were in critical condition at the time of operation. They died of the cachexia associated with their cancer. Of the remaining 3 deaths 1 was due to an ascending pyelonephritis (autopsy), 1 was due to embolism on the eighth day, and the third to a partial evisceration on the tenth day. (In our series of pelvic sympathectomies performed for severe dysmenorrhea, we have had no deaths.)

ALCOHOL INJECTIONS

Of the 40 women who received intraspinal alcohol injections 37 had Group IV and 3 had Group III carcinoma of the cervix. Thirty-four (85 per cent) of the women experienced complete relief, 2 (5 per cent) had partial relief, and 4 (10 per cent) had no relief from the injection.

In the patients completely relieved, pain has not recurred even after eight and a half months following the injection. Of the 2 women who received partial benefit from the injection 1 was completely relieved of the pain she had in the lower abdomen and right leg but her backache persisted. The other patient experienced complete

to births, and it explains, also, how this procedure vitiates any maternal death rate which includes abortion fatalities. That the general rate may in reality thereby suffer very considerable distortion can be realized when we note that in some communities abortion provides a considerable proportion of the total mortality (Germany, Stockholm, etc.). On the general questions surrounding the influence which abortion exerts on the maternal death rate, Dr. Ida Hirschmann and I are at the moment conducting an investigation, the results of which we hope to publish in the near future.

In the absence of any means of obtaining a knowledge of the total pregnancies, which alone could provide the basis upon which to assess the death rate in those exposed to risk, some observers have pointed to the advantage of the total female population or the total female population between the reproductive ages (fifteen to forty-five) as the denominator on which to estimate the general rate. This method is, of course, open to the objection that the continual shrinkage in the birth rates of most western communities implies a variation in the pregnancy

TABLE I

	TOTAL LIVE BIRTHS	TOTAL ABORTIONS	ABORTION DEATHS	ABORTION DEATH RATE PER 1,000 LIVE BIRTHS
First year	2,000	500	1	0.5
Second year	1,500	1,000	2	1.33
Third year	1,000	1,500	3	3.0
Fourth year	500	1,000	4	8.0

rates from year to year, and therefore a denominator which is as variable and as indeterminate as that based upon live or total births. It has been claimed, however, that this risk is largely eliminated by the consideration that a declining birth rate does not imply a declining conception rate. Genss,³ indeed, in a statistical study of the Russian problem, has assumed that it is inherently probable that in a modern community the conception rate is static and that any fluctuation in the births is determined by changes in the abortion rate. According to this view intentional restriction of fertility and contraception play a relatively insignificant part in the declension of the birth rate of modern civilized countries. This somewhat startling assumption is naturally incapable of proof though the rapid increase in the abortion death rate of many communities lends support to the view that it may be true in a greater degree than is ordinarily recognized. In some German towns, for example, it is found that the fall in the birth rate is determined almost exactly by the rise in the abortion rate.

We have to admit that there is no satisfactory method of dealing with the abortion problem according to the ordinary statistical procedures at present in use. Meanwhile, it is imperative for us to recognize the

lumbar region. Whether injections made higher up (in the thoracic region) can do this, we are not prepared to say because we have not tried this as yet.

We have long been of the opinion that every woman who has a Group III or Group IV carcinoma of the cervix should have either a retrograde or an intravenous pyelogram. Experience with the failures in our cases of alcohol injection has strengthened this opinion still more. Surely all women with advanced carcinoma who have severe pain in the pelvis should have a pyelogram.

Pain in the pelvis in cases of cervical carcinoma is due to one of the following three causes in the order named, (1) pyometra, (2) invasion or obstruction of the urinary tract, and (3) extension into the parametrium. The pain due to pyometra can readily be relieved by dilatation of the cervix to permit drainage of the uterine cavity. Pain due to invasion of the bladder with or without fistula formation can be relieved by either pelvic sympathectomy or alcohol injection. However, obstruction or invasion of the ureter with hydroureter and hydronephrosis cannot be relieved except by nephrectomy. Pain due to extension into the parametrium with fixation can be relieved by alcohol injection but not by sympathectomy. Very late in the disease, if the patients live long enough, pain is felt high up in the abdomen. This is due to extension of the disease above the sacrum into the aortic and iliac glands, into the liver and elsewhere. This type of pain cannot be relieved by either sympathectomy or alcohol injections in the lumbar region.

It is a good policy to inject alcohol intraspinally in all patients who have severe pain associated with carcinoma of the cervix, because even in women who have a hydronephrosis and other sources of pain we can relieve some of the pain. Nearly all of these women have pain not only due to the hydronephrosis but also due to extension of the carcinoma in various parts of the pelvis and the latter pains can readily be relieved by the alcohol injections.

When a pyelogram reveals the presence of a marked hydroureter and hydronephrosis in women with pelvic pain, we can determine whether the hydroureter is the cause of the pain in the parametrium by dilating the ureter and leaving a catheter in the ureter for twenty-four hours. If the pain is relieved by the ureteral catheter, the most likely cause of the pain is the stricture of the ureter and the hydronephrosis. If the patient is in fairly good physical condition, a nephrectomy should be done. If, however, the pain in the parametrium persists in spite of the ureteral dilatation and indwelling catheter, the pain is most likely not due to a ureteral stricture and hydronephrosis, and the patient can be promised relief from nearly all her pain by means of an intraspinal alcohol injection.

As time goes on, some of the patients who have thus far experienced complete relief from the alcohol injections will undoubtedly have a recur-

These reports may with justice be regarded as embodying the first attempts made on an adequate scale to discover the conditions responsible for the relatively high and the disturbingly persistent lethality associated with childbearing and childbirth in the United States and in Great Britain during the past decades. It is not my purpose to review in any detail the findings of these various committees. The problems with which they have to deal are conditioned by the circumstances obtaining in the countries and areas concerned, and these are sometimes so divergent as to make any comparisons difficult and even useless. There are some respects in which the several reports arrive at conclusions which are so similar on matters of supreme importance that they may be regarded as having for the first time thrown up in an unequivocal manner for the guidance alike of the profession and of the public some of the basic causes of the present obstetric impasse of our two countries. It is to these that I desire more particularly to invite your attention.

PREVENTABILITY OF MATERNAL DEATHS

The English, the New York, the Philadelphia, and the Scottish reports addressed themselves especially to this subject and concluded from the facts at their disposal that, of the total deaths examined, 45.9, 65.8, 56.7, and 58.7 per cent, respectively, were due to errors of judgment or of negligence that were preventable. Implicit in all such attempts to assess the extent to which mortality is avoidable is the firm conviction of the assessors that the figures given are minimal and that with a full knowledge of the facts it would have been possible to extract a much larger degree of preventability.

The causes of maternal mortality may be classified conveniently under three headings: (a) Those morbid states, which specially complicate pregnancy, labor or the puerperium, and those associated diseases which add to the risk of the pregnant and the puerperal conditions. (b) The trauma and other surgical risks that accompany ill-advised obstetric interference. (c) Abortion.

Under the first heading we have puerperal conditions, such as the toxemias, the hemorrhages and disproportion, and nonpuerperal conditions, such as heart disease and pulmonary tuberculosis. These various states must always exact a certain maternal toll, although it is, at the same time, well established that where the service is good the risks to life which they imply can be largely eliminated. The different reports deal with the measure in which these various morbid processes cause mortality and with the methods, preventive and therapeutic, by which they can be fought. One of the most inspiring themes running through modern midwifery is the rôle which preventive care is capable of exerting in such conditions. Even where in regard to ultimate causes our knowledge may be defective we know that detection in time can largely allay the danger, albeit it often demands the premature ending of the pregnancy and, it may be, the sacrifice of the child.

Clinical Group III cases become painful when stenosis of the cervical canal ensues, blocking the secretions within the uterine cavity. It results from the tumor or from contraction of the canal after intracervical and intrauterine radium insertions. Dilatation of the canal and insertion of a soft rubber tube T-drain relieve the intermittent pain from hydro- or pyometra permanently.

Clinical Group IV cases are characterized (a) by a frozen pelvis; (b) by an invasion of the vaginal mucosa, the vesicovaginal septum and vesical mucosa, the rectovaginal septum and rectal mucosa; (c) by distant metastases.

The frozen pelvis may compress the ureters and the parietal and visceral pelvic nerves. Compression of a ureter leads to retention of urine in the corresponding ureter and kidney. This causes flank pain which may radiate down into the inguinal canal and the inner aspect of the thigh. It is relieved by dilatation of the ureter and indwelling catheter. If it persists and the cancer has become arrested then ureteral transplantation into the colon, or, with extensive kidney damage, roentgen ray destruction of the kidney epithelium or nephrectomy should be considered. However, major operations should be avoided if possible on account of the poor general condition of such patients.

Invasion or compression of the parietal and visceral pelvic nerves causes excruciating backache, deep buttocks pain radiating down the outer aspect of the thigh along the sciatic nerve, or deep pelvic pain radiating to the perineum along the perineal nerve. Invasion of the bladder, the urethra and the rectum causes functional disturbances and painful function in these organs.

The sensory nerve fibers from the sympathetic presacral ganglia or the somatic sensory nerve fibers arising from the anterior horn of the cord are involved. Presacral sympathectomy stops the pain derived from this ganglion, and intraspinal alcohol injections arrest the pain originating in the sensory nerve fibers from the cord.

The conclusions of the essayists to use alcohol injections by preference are sound, as many patients are relieved for a long time. The motor disturbances result from a concomitant action of the alcohol on the adjacent motor fibers. However, these nerves recover almost invariably if the action of the alcohol is controlled by a proper position of the patient, as shown recently by animal experimentation in cats by Nafziger et al.

However, many patients may be relieved by a roentgen ray treatment applied to the midpelvis, of a 600 T dose with 200 KV. This is a safe dose.

Should alcohol injections and roentgen treatment not help, then presacral sympathectomy should be considered.

DR. F. S. WETHERELL, SYRACUSE, N. Y.—Three years ago when I presented a paper before this Society, Dr. Greenhill said that he saw no reason for advising such a formidable operation as a presacral sympathectomy for some of the conditions for which I advocated this treatment. Today he says it is very simple. I have now come to the conclusion that at times it is very formidable, particularly in carcinoma where the glands are firmly adherent to the aorta and the common iliac arteries.

Regarding alcoholic injections, it should be borne in mind that after the injection the patient should be leaning forward so that the sensory fibers are uppermost as far as possible, thus allowing the alcohol to float upward, preventing action on the motor fibers.

In evaluating the freedom from symptoms after the injection, the possibility that the patient may be a morphine addict must be kept in mind.

Of course, chordotomy is often the method of choice because it does eliminate, if the proper tract is cut, many of the complications we find with either alcohol injections or presacral neurectomy. I would advise that the detailed technique be carefully

countries it is one of the most important of all the factors that disturb the safety of midwifery. It is well known that in industrial areas with a poorly organized service instrumental interference is rife. In some practices more than 50 per cent of the deliveries are admitted to be instrumental. Further evidence is revealed in the number of women sent to the large central hospitals suffering from grave trauma after the "failed forceps" operation. There are, moreover, some individual area records which bear on the same question. Thus, during an investigation,⁹ with which I was personally concerned, of the obstetric conditions obtaining in a Lancashire town (Rohdale), which for some years had had the highest maternal mortality in England and Wales, it was discovered that one of the main factors was unwarranted or unskillful obstetric interference and that improvement in the service led within a short time to a reduction of the death rate from 8.90 to 2.99 per 1,000 live births. The Scottish Report contains incriminating evidence of a like kind. It states that "in as high a proportion as 24 per cent of all births recorded during the six months' intensive survey delivery was not spontaneous. The majority of these were assisted instrumentally. Among mothers who died the proportion of instrumental deliveries (excluding deaths from abortions, extrauterine pregnancy, and all cases in which pregnancy had not advanced to the seventh month) was high (51 per cent) and, since detailed examination of the death schedules showed (a) that the necessity for interference was often not apparent, and (b) that the general health before and during pregnancy of those mothers whose deaths were attributed to sepsis after instrumental delivery, failed forceps, etc., was well up to standard, it seems fairly obvious that interference during parturition is an important and preventable contributory factor in the total maternal death rate."

While these facts bear unchallengeable witness to the tragic part which unwise surgical interference with the course of labor plays in modern obstetrics, the most convincing evidence is obtained from the low death rates found in those practices in which the service is so organized as to allow that proportion of delivery which is inherently normal, that is, about 95 per cent of the whole, to be protected against this rage for meddling "assistance." The obstetric experience of such a country as Holland is illuminating in this connection. Here the most outstanding feature of the maternity services is the emphasis placed on natural labor. Surgical delivery is rare and, further, those patients in whom the delivery is found to be difficult are sent to the hospital to be under the care of specially selected and experienced obstetricians. It is to the existence of a national obstetric service, which protects the normality of labor, that the relatively low maternal death rate of Holland (3.16 per 1,000 live births in 1933) is chiefly due.

The supreme influence of the safeguarding of the normal ease on the whole outlook of obstetrics is, further, strikingly revealed in the records

it might be possible to destroy the remaining portion of the kidney on that side with roentgen therapy. Several years ago I presented the results of some work on destruction of kidney substance with the roentgen ray.

DR. GREENHILL (closing).—My differences in opinion with Dr. Wetherell can easily be explained. I said that sympathectomy was a relatively simple operation for advanced carcinoma of the cervix. When we consider that patients with an advanced carcinoma are in a hopeless state, sympathectomy is not a serious operation. However, when a laparotomy is performed for a condition which is not serious, such as dysmenorrhea, then surgical procedures are formidable, especially when the condition can be treated by nonsurgical measures.

Experiments on cats and dogs have shown that injection of alcohol in proper dosage is not injurious to the spinal cord. Dr. Babcock has shown that drugs other than alcohol affect the sensory nerves more than the motor nerves. Undoubtedly diminished myelinization of the sensory roots accounts for this difference.

Some German authorities claim that in certain instances kidneys, the function of which has been eliminated by x-rays, may have a restoration of function. Since, however, patients with advanced carcinoma may not live long enough to have a kidney regenerate, this form of treatment should prove useful in patients with hydronephrosis.

I recommend that alcohol be used in all women who have carcinoma of the cervix, for, regardless of the amount and character of the pains which such patients may have, at least some of the pain will definitely be relieved. This is due to the fact that most women with advanced carcinoma of the cervix develop various kinds of pains as the disease progresses.

UTERINE BLEEDING*

A STUDY BASED UPON 1,048 CASES

A. J. RONGY, M.D., A. TAMIS, M.D., AND H. GORDON, M.D.,
NEW YORK, N. Y.

THE practice of modern gynecology is not confined merely to diseases peculiar to women but embraces many problems associated with the sexual life. It includes the essential factors which motivate and control the immediate and intimate marital relationships. A woman now expects the gynecologist to advise her not on purely medical anomalies alone but also on sexual and psychologic reactions which often produce more disturbances than the derangement induced by actual pathologic changes in the genital tract.

Similarly is this true of a gynecologic service in a hospital. The individual patient must not be treated on a basis of the pathologic findings only; the clinical signs and symptoms should be carefully analyzed before a particular method of treatment is decided upon. Care must be taken that the kind and type of treatment selected must not only cure

*Read at the Forty-Eighth Annual Meeting of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons held at Skytop, Pa., September 16 to 18, 1935.

it is impossible to evade the conclusion that in each group the factors which have moulded obstetric method and policy have sprung from like origins.

It is sometimes claimed that the widening of the range of operative delivery arises directly from the increased sense of security derived from anesthesia and modern surgical progress and from the influences which education and social change have brought to play on woman's life. It is impossible to deny the operation of these and other agencies of a like nature. At the same time it may be a disservice both to our calling and to the community if we fail to appreciate in the clearest possible way that, although important in themselves, these factors possess a significance which is purely secondary. In this connection we have to note specially that Holland and Scandinavia, though similarly exposed to the influence of modern surgical discovery and to the effect of changing social and economic conditions, have, nevertheless, succeeded to a relatively high degree in protecting their midwifery from being swept along by the surgical stream that within recent decades has increasingly tended to overwhelm the American and British systems.

MAN AND WOMAN MIDWIFE

The somewhat strange phenomenon represented by the existence of two such distinct patterns of obstetric method in modern communities, whose general medical practice is otherwise similar, has a historical background of peculiar interest to the obstetrician. To trace the parting of the ways we have to revert to the eighteenth century and to the conflict for obstetric supremacy which then broke out between the woman and the man midwife. The spirit of scientific inquiry brought to bear on the midwifery of the day by such men as Smellie, William Hunter, and Denman, threw into clear light the crude and often barbarous nature of many of its practices. The awakening which then resulted led, as we know, to a rapid improvement in principles and methods and ultimately to the development of modern scientific midwifery. While both the woman and the man midwife shared in this improvement, in Great Britain the supremacy was wrested from the former and the controlling influence from thenceforth remained firmly in the hands of the male practitioner. It was, indeed, not until within comparatively recent years, with the passing of the Midwives' Act in 1902, that the midwife emerged from the position of unqualified "handy-woman" in which she had been compelled to carry on her work during the preceding ages. In Great Britain the midwife has now by statute obtained a position for herself, although much remains to be done before she can be regarded as capable, by virtue of her training, of fulfilling her highest service or, by virtue of her economic security, of forming an entirely stable element in the maternity machine. In the United States, I understand, the position of the midwife is even more uncertain.

TABLE I. CAUSES OF BLEEDING IN 2,175 GYNECOLOGICAL ADMISSIONS
1922-1933

DISORDERS OF PREGNANCY 1,167	NONPREGNANT DISORDERS 1,008				
	INFLAMMATORY 119	CIRCULATORY 48	FUNCTIONAL 220	NEOPLASTIC	
				BENIGN 586	MALIGNANT 35
Incomplete ab.	646	39	22	1	500
Threatened ab.	86	23	Precocious puberty	1	Ca. cervix
Inevitable ab.	57	Ch. endomet.	26	1	Ca. fundus
Complete ab.	62	Ac. salping.	*Fibrosis ut.	218	Ca. ovary
Missed ab.	44	Pyosalpinx		Polyp	Sarcoma ov.
Septic ab.	7				Granulosa tumor of ovary
Miscarriage	53				
Ectopic preg.	194				
Hydatid. mole	12				
Chorionepith.	6				

*Fibrosis Uteri, Includes Menorrhagia, Metrorrhagia, Menopausal Bleeding.

at the special school at Amsterdam for a period of three years, during which she has witnessed about 1,800 pregnancies and deliveries, is equipped with an experience in ordinary midwifery and a knowledge of the signs of danger, which are denied the students trained at our medical schools. In the third place, the dedication of the life of the midwife to attendance on a function which is essentially natural implies that her outlook is pervaded by the spirit of the normal and the physiologic in contrast to that of the doctor and the ordinarily trained nurse, whose whole training has tended to a preoccupation with the abnormal and the morbid. In the fourth place, the provision for every woman in labor of an experienced midwife implies that certainty of skilled attendance and that consolation and comfort which at such a time a woman can best give. It is one of the most apparent weaknesses of our present system that the laboring woman is often left under the care of an unskilled "handy-woman" and that the contingencies of his practice and frequent inexperience in matters obstetric make the attendance of the doctor often haphazard and unsatisfactory.

In Great Britain today these facts are becoming increasingly appreciated with the result that strenuous attempts are being made to reinstate the midwife in her position of trust and responsibility. The British Medical Association in its Scheme for a National Maternity Service¹⁰ has laid down as one of the essential desiderata the provision of a well-trained midwife for every pregnant and laboring woman. The Committee on Maternal Mortality and Morbidity of the Ministry of Health in its Final Report (page 34) states that they are satisfied that "extension of the employment of midwives in normal cases in this country is an essential condition of a satisfactory service, and they consider that as midwives become better instructed in the matter of antenatal care the routine supervision of pregnancy, subject to the medical examination during that period, may with advantage, be increasingly entrusted to them." As a member of the committees of these two bodies I was in a position to recognize the nature and the force of the arguments which led to their decisions. It is becoming more and more understood that the handing back of the bulk of the maternity of the country to the midwife demands that the period of her training should be greatly lengthened and its nature improved, and it is appreciated, also, that much requires to be done to strengthen her social and economic status.

I have given examples of large practices where artificial interference has been reduced to a figure standing at 5 per cent or even lower. It is significant that in such cases the routine service is in the hands of the midwife. The lesson to be drawn from these and similar examples of large scale maternity services, whether domiciliary or hospital, is that the skilled midwife is the most precious element in the scheme. In my own hospital service with a forceps rate of about 3 per cent the doctor members of the staff recognize the key position accorded to the senior

whether the patient is still in the active childbearing period. Our preference during this period is the classical Gilliam operation, which we have done in a great many women who subsequently have had one or more children, and in whom the uterus remained in good position. A preliminary curettage is performed in order to exclude polyps, malignancy, or retained products of conception, which had become organized and adherent to the uterine wall. Vaginal pessaries for the correction of retrodisplacement of the uterus, especially in patients who had already developed menstrual disturbances, were found inadequate. They neither modify the bleeding nor correct displacements. On the whole, the use of pessaries in young women is not desirable. They often cause irritation of the posterior vaginal wall, especially when they are used over a long period of time.

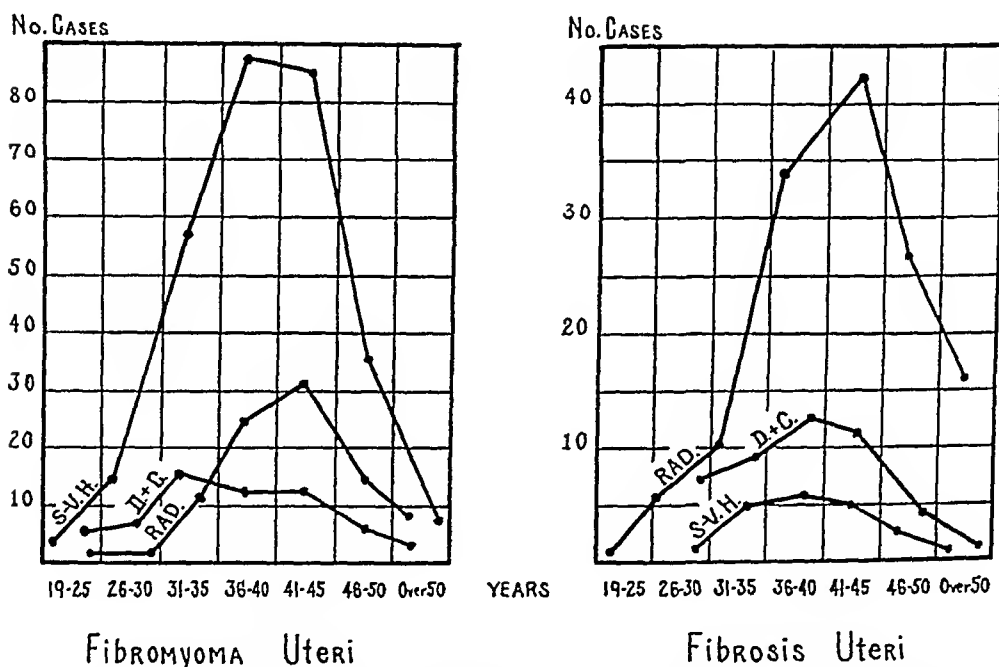


Fig. 1.—Manner of treatment of fibromyoma uteri and fibrosis uteri with particular reference to age.

It should be pointed out, however, that bleeding is not a prominent symptom in uterine displacements. In a recent study of 501 cases of prolapsus uteri, bleeding occurred in only 7 per cent of the cases.

3. *Bleeding of Neoplastic Origin.*—The management of patients suffering from fibroids of the uterus presents a special problem. The tendency to obesity and other metabolic disturbances is definitely greater among Jewish women in the fifth and sixth decades of life than in some of the other groups of the population. They are overweight and more prone to cardiovascular disorders. Many are definitely poor surgical risks. Furthermore some are compelled to carry the economic burden of the family. Undue care, therefore, must be taken as to the kind of treatment given these patients. Not infrequently, in order to assure greater safety or to accomplish a cure in the shortest possible time, we have

prominent since the War, and in the large towns it is so marked that it has completely revolutionized the whole maternity services. The same phenomenon is exhibited by European countries and the New York Report states that during the years 1931 to 1933 over 70 per cent of the confinements occurred in hospitals. How far this change is to be regarded as one which has come to stay or as one which merely expresses a temporary post-war phase, it is yet impossible to say. I cannot discuss in any detail the manner in which it is changing the face of obstetric practice. It is imperative that we recognize that, apart from the risks of epidemic sepsis which are specially aggravated thereby, so far as we are receiving women for mass care, it is incumbent on us to press forward to the creation of a high uniform standard of hospital service and personnel. In some ways the opportunity is thereby being provided for a wholesale uplift in the obstetric work of the country, and, indeed, there are some obstetricians and publicists who maintain that in the encouragement of hospitalization we can alone expect to find salvation.

ABORTION

This constitutes the cause of the third group of maternal deaths which still remains for our consideration.

I have already alluded to the manner in which the rising abortion death rate is creating a problem of great gravity. In modern civilized communities the deaths from abortion comprise a large and, in many cases where the evidence is available, a steadily increasing proportion of the total maternal mortality rate. The New York Report states that between the years 1931 and 1933 abortion caused 21 per cent of the total deaths ascribed to puerperal causes, and that these had increased by 52 per cent over this short period. In the Philadelphia Report abortion is shown as causing 29.6 per cent of the total puerperal mortality during three years. In England and Wales the Ministry of Health returns indicate that abortion in 1930 caused 10.5 per cent of the mortality and that in 1933 this figure had increased to 16 per cent. The abortion death rate tends to be highest in the towns and lowest in the rural areas. Thus, the Registrar-General states that for 1930 the percentage of deaths from sepsis returned as following abortion was 35.1 in London, 24.6 for country boroughs, and 19.0 in rural districts. In Berlin during the years 1922 to 1924 the percentage of the sepsis death rate due to abortion was 81.2, while it has been computed that during the five years 1926 to 1930 postabortion sepsis accounted for more than 50 per cent of the *total* puerperal death rate in Stockholm.

There can be little doubt that the bulk of the deaths following abortion are consequent upon intentional interruption of pregnancy and that the increase is to be attributed to a widespread extension of criminal practices. This is reflected in the high proportion of the total which is due to sepsis. In the New York Report 73.4 per cent, and in the

of discomfort and pain in the lower part of the abdomen. We have been confronted with this condition on numerous occasions and have regretted that we conserved the ovaries in some of these patients.

We never tell the patients, however, that both ovaries have been removed. The average woman becomes apprehensive and fearful lest her sexual life be affected because she no longer has ovaries.

The technic usually followed is a modified clamp-ligature operation. The uterus is amputated below the internal os. The broad and round ligaments are sutured with a continuous overhead suture and are attached on either side to the angles of the cervical stump. This tends to lift up the roof of the vagina, giving additional support to the cervical stump and undoubtedly preventing its prolapse. The operation is performed speedily by this method, for all the vessels are secured in the clamps before they are ligated.

Myomectomy.—Whenever it is possible or feasible, we perform a myomectomy, especially in young women recently married, who are sterile. We follow this procedure with the full knowledge that in many of these patients it may have to be performed again. Very often the reconstruction of the uterus after the removal of a number of fibroids is a tedious process, but as long as the continuity of the genital tract is not destroyed by the removal of the tumors, there is always a chance for pregnancy.

This is best illustrated by the following case: A young woman, married two and one-half years, complained of sterility. Upon examination a large intramural fibroid, situated in the right wall of the uterus, was discovered. She was advised to have the tumor removed. She was operated upon Oct. 31, 1930. Upon opening the abdomen an intramural fibroid of about the size of an orange was found in the anterior wall, involving the isthmal portion of the fallopian tube. The enucleation of the fibroid involved the resection of the right wall of the uterus and a portion of the fallopian tube. Two small fibroids were also removed from the anterior wall. The left tube and ovary appeared normal. The patient made a good recovery and was discharged from the hospital at the end of the fourteenth day. The menstrual function continued normally without undue disturbance, except that it was somewhat prolonged. On June 8, 1932, the tube was tested for patency, and it was found open. She consulted me again July 7, 1933, stating that she had menstruated last May 23, and felt nauseated and vomited occasionally. On examination she was found six weeks pregnant. The pregnancy progressed normally and on Feb. 22, 1934, she was delivered by cesarean section of a normal child. On opening the abdomen the pregnant uterus appeared somewhat oblong and uneven. There were omental adhesions to the right side of the uterus. She made an uneventful recovery and left the hospital on the fifteenth day.

We had a number of patients who became pregnant after myomectomies had been performed on them and delivered themselves normally. At times it is very difficult to reconstruct the uterus after a number of fibroids have been enucleated; still the effort is worth while; even if pregnancy does not ensue, the menstrual function is maintained, which is an important factor especially in women who have been married a very short time.

CLINICAL AND PATHOLOGIC DIFFERENTIATION OF CERTAIN SPECIAL OVARIAN TUMORS*

GRANULOSA CELL CARCINOMA, ARRHENOBLASTOMA, DISGERMINOMA,
BRENNER TUMOR

EMIL NOVAK, M.D., AND LAMAN A. GRAY, M.D., BALTIMORE, MD.

(From the Gynecological Department, Johns Hopkins Medical School)

THE purpose of this paper may be set forth very simply. Within recent years attention has been called to a group of ovarian tumors which had hitherto been unrecognized, and which even now are frequently overlooked by pathologists and clinicians alike. Certain members of this group are not very rare, and all are of unusual interest, because they so frequently exhibit biologic properties of great interest, especially in this day of universal interest in problems of endocrinology.

It is difficult to apply any inclusive generic name to this group of neoplasms. Most often they have been referred to as "certain special" ovarian tumors, obviously a meaningless designation, especially in view of the fact that the ovary is so often the seat of other tumors which are "special" in the sense that they cannot be included under such general designations as carcinoma or sarcoma, and which presumably involve some special local histogenetic mechanism. As a matter of fact, it is our ignorance of their histogenesis which makes the classification of ovarian tumors so notoriously unsatisfactory.

The group which will be discussed in this paper includes certain tumors whose origin is linked up with anomalies in the embryologic development of the ovary, so that, in a very broad sense at least, they may perhaps be spoken of as tumors of dysontogenetic origin. The four members of this group which will be considered in this paper are granulosa cell carcinoma, arrhenoblastoma, disgerminoma, and the so-called Brenner tumor.

There is no doubt that many gynecologists and gynecologic pathologists are still much confused as to the clinical and pathologic differentiation of these growths, and it has seemed to us that a simple exposition of their distinctive characters might be well worth while, particularly as so little has been written on the subject in this country. The foreign literature, especially the German, is full of discussions and reports of these tumors, but, with the exception of granulosa cell cancer, only one or two papers in the American literature have concerned themselves with any discussion of the other types. There are, of course, a

*Read at the Forty-Eighth Annual Meeting of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons, Skytop, Pa., September 16 to 18, 1935.

TABLE III. FOLLOW-UP DATA OF 111 CASES FIBROMYOMA UTERI TREATED WITH RADIUM

	19-25	26-30	31-35	36-40	41-45	46-50	OVER 50	TOTAL
No. cases	2	2	3	29	36	24	15	111
<i>Clinical Result</i>								
Cured		2	2	27	35	24	15	105
Improved	1			1				2
Unimproved	1*		1*	1*	1			4
<i>Cessation of Bleeding</i>								
Immediate	1	1	2	27	31	22	14	98
1 month postradiation		1		1	4	1	1	8
<i>Effect on Mass</i>								
No effect	1		1					2
Diminution in size	1	2	2	29	34	22	14	104
Complete involution					2	2	1	5
<i>Flushes</i>								
None or slight	2	1	2	8	12	11	7	43
Moderate				6	7	6	6	25
Severe		1		15	17	7	2	42
<i>Late Symptoms Following Radiation</i>								
Leucorrhea		1		8	4	4	1	18
Vesical irritation				2	4	1	1	8
Abdominal pain				6	3	4	2	15
Pruritus				2		1	1	4
Diarrhea					1			1
Rectal tenesmus				1				1
Rectal bleeding				1				1

*Additional x-ray or radium given.

*Error in diagnosis (ectopic).

TABLE IV. FOLLOW-UP DATA OF 76 CASES FIBROSIS UTERI TREATED WITH RADIUM

	19-25	26-30	31-35	36-40	41-45	46-50	OVER 50	TOTAL
No. cases	1	4	8	14	25	12	12	76
<i>Clinical Result</i>								
Cured		2	7	12	25	12	12	70
Improved	1	1		1				3
Unimproved		1*	1*	1*				3
<i>Cessation of Bleeding</i>								
Immediate		2	7	11	22	10	12	64
1 month postradiation				2	3	2		7
<i>Flushes</i>								
None or slight			3	9	14	8	11	45
Moderate			3	2	6	2	1	14
Severe		1	2	3	5	2		13
<i>Late Symptoms Following Radiation</i>								
Leucorrhea			1	1	2		1	5
Vesical irritation			1	2	1	1		5
Abdominal pain		1	1	3	7	1	1	14
Rectal bleeding					1			1

*Supravaginal hysterectomy done later.

*Error in diagnosis (ovarian cyst).

female. In the former they link up with the mesonephric structures, become canalized and develop into the seminiferous tubular structure and the vasa recta of the testis, the wolffian duct itself becoming the vas deferens.

This pro-testicular apparatus, as already mentioned, develops even in the gonad destined to become an ovary, but in the latter it is transient, the medullary columns undergoing atrophy and disappearance, though traces of them are to be seen quite frequently even in the adult ovary, especially in the region of the rete ovarii. The distinctive female histologic characteristics, therefore, are developed over the fossil remains of the male apparatus, which explains why in the region of the rete ovarii cells may persist which retain male capacities, and which may give rise to tumors with distinctly masculinizing tendencies. This, at any rate, is Meyer's explanation of the origin and the biologic properties of the so-called arrhenoblastoma or masculinizing tumor.

The first proliferative wave, just described, so important in the male and so apparently futile in the female, is in the case of the latter succeeded by a second process of proliferation and differentiation represented by the so-called Pflüger tubules. The epithelium making up these cell columns has in the past been thought to be due to the invasive growth of the germinal epithelium into the underlying mesenchyme, but the evidence of recent investigations points more and more to the view that these cells, representing the future follicular epithelium, are formed by a modification of the mesenchyme in loco (Fischel, Plitzer). Still another viewpoint is that both factors are concerned (Higuchi).

In any event, the cell mass is soon trabeculated by mesenchymal tissue growing up from the hilum, and the beginnings of follicular architecture are thus formed, the epithelial cells grouping themselves in clusters about the central germ cells or oögonia. Here again we encounter a possible source of future neoplasm, for rests of unused granulosa cells may persist, being actually demonstrable at times in the ovaries of young children and even of adults. From these rests of redundant granulosa are developed the granulosa cell tumors. Since the occurrence of granulosa tissue presupposes that the female character of the gonad is already established, it is not surprising that the tumors developing from these cells exert upon sex characters the characteristic effect of granulosa cells in general, that is, a definitely feminizing effect.

Finally, in the development of the ovary, as in that of other organs, rests of sexually indifferent cells which have lagged behind the differentiating wave not infrequently persist. The classical studies of Walthard, in 1903, furnished a histologic demonstration of such nests or tubules not only on the surface and in the cortex of the ovary, but also on the surface of the tubes and the broad and round ligaments. It is not rare, in the routine examinations of laboratory material, to observe solid, or partially cystic nests of large clear cells on the perito-

results were not uniformly good. Many developed a complete eversion of the vaginal vault following the operation. In fact very often the prolapse of the vagina is so complete that it forms a hernial sack for the bladder, rectum, and small intestine. Repair of such a vaginal hernia is difficult and often a complete obliteration of the vaginal vault is required in order to cure the hernia. This is certainly an undesirable procedure for women during the fifth and sixth decade of life. The use of radium has simplified the problem. We are now able to treat them in a more logical manner, for once the problem of bleeding is eliminated, the damage to the vaginal vault can be repaired in the usual way. We have come to know that the use of radium is safe in conjunction with the vaginal plastic operation. In fact it is our impression that the healing of wounds progresses more favorably because germ life is impeded by the radium emanation. We have used radium in a number of patients who were suffering from abnormal uterine bleeding, and at the same time, we have performed the interposition operation for procidentia or other operations on the cervix and vaginal vault. The results in this group of cases were uniformly good.

CERVICAL POLYPS

Irregular bleeding caused by cervical polyps is not uncommon in women approaching menopause. The removal of the polyp and curettage does not always accomplish a permanent cure. The bleeding often recurs six to nine months later. We now use small doses of radium in these cases as a routine measure and as a prophylactic against future bleeding. We have not observed a local reaction either in the cervical canal or in the parametrium of any of the patients, although many gynecologists warn against the use of radium in such cases. However, the use of radium following the removal of submucous fibroids is contraindicated, for it may produce sloughing of the uterine surface and pyometria is likely to ensue.

POSTIRRADIATION PAIN

There is no doubt that many patients develop pain in the lower part of the abdomen following the use of radium. The pain lasts anywhere from six to eighteen months. The pain usually becomes localized in the left or right groin. It bears no relation to the site or size of the fibroid. On the contrary it seems that the pain is less intense in patients who have large fibroids than in those who have small fibroids, and it is more pronounced in subperitoneal fibroids. It is difficult to assign the cause for the pain. It may be that the involutionary process is accompanied by pain, because of trophic disturbances which take place in the growth, causing greater sensitivity of its nerve supply. The pain may also be caused by the degenerative changes which take place in the ovaries, and this may be the reason why it is localized in the groins. But the pain is not permanent, for it gradually subsides.

further supply would scarcely be expected to produce any noteworthy effect upon the sex characters. On the other hand, it would be natural to expect that a persistent overproduction of estrin might influence menstruation, just as the latter is influenced by the estrin overproduction characterizing the so-called functional bleeding cases. As a matter of fact, the menstrual symptoms of granulosa cell tumors are very much like those of the estrin excess seen in the functional cases. Excessive bleeding is most common, though in many cases the amount of flow is normal, and in not a few there may be periods of amenorrhea lasting even many months.

When these tumors, however, affect children or elderly women, in whom estrin production is normally in abeyance, the invasion of the organism by considerable amounts of estrin produces against the now stark sex ground far more spectacular effects upon both menstruation and sex characters. In either children or elderly women bleeding is produced, and this is usually periodic, so that in the one case a precocious menstruation, in the other an apparent reestablishment of the function, is the common result. The bleeding in these cases is the purely estrin-induced type, similar in its endocrine mechanism to the functional bleeding and the so-called anovulatory cycle seen during reproductive life.

Even more striking, in the young child, are the effects produced upon the secondary sex characters; this as a matter of fact, constituting one of the strongest evidences of the direct rôle played by the female sex hormone in the normal production of these sex characters. In the prepubertal age, the production of large amounts of estrin brings about precocious puberty, with accelerated skeletal growth, striking development of the breasts, and the growth of hair on the external genitalia and in the axillae.

In the postmenopausal cases, the two most characteristic effects are uterine bleeding and the production of endometrial hyperplasia. If, therefore, in a case of uterine bleeding occurring long after the menopause, the diagnostic curettage yields a typical endometrial hyperplasia, one may strongly suspect the presence of a granulosa cell tumor of the ovary, even if palpation is negative, as it may be if the tumor is very small or the patient very stout. If, on the other hand, a tumor can actually be felt in such a patient, there is little doubt of its granulosal nature.

That these tumors actually produce estrin is indicated not merely by the extraction of large amounts of estrin from the tumor substance, for this would in itself be inconclusive in the light of recent tumor hormoneology. So would the fact that implantations or extracts of the tumor have been shown to produce typical estrous phenomena in castrated animals. But the finding of large amounts of estrin in the blood and urine of children or elderly women is more significant, while the typically granulosal morphology of the tumor cells in most cases justifies the as-

4. Supravaginal hysterectomy should be the operation of election. It is definitely a safer procedure in the hands of the average gynecologist. The cervical stump should be thoroughly cauterized before it is peritonized; this helps to cure the endocervicitis.

5. The tubes and ovaries should be removed in patients over forty-five years of age. Many of these patients have an insidious inflammation of the tube or ovary at the time of the operation, which becomes more acutely inflamed after manipulation and produces pain and tenderness in the lower portion of the abdomen for a long period of time.

6. Patients who suffer from intramural or flat subperitoneal fibroids and the uterus is enlarged to about the size of a three months' pregnancy should be treated by eurette and radium.

7. Bleeding associated with "fibrosis uteri" can almost always be controlled by eurette and radium.

8. Patients in the fifth decade of life who suffer from cervical polyps should have small doses of radium; 800 to 1,000 me.h. has a prophylactic measure against future bleeding. Many of these patients suffer from associated "fibrosis uteri" which sooner or later causes menorrhagia or metrorrhagia.

9. Vaginal plastic operations may be performed conjointly with the use of radium.

10. A small dose of radium to be used over a longer period of time is preferable to a large, highly concentrated dose. There is less likelihood of an intrauterine radium burn taking place when small doses of radium are used. The average dose used to control bleeding in this series of cases was about 1,800 me.h. The smallest dose was 800 me.h., the largest was 2,400 me.h. The dosage varied depending upon the age and local condition of the patient.

11. The degree of the severity of the menopausal symptoms is about the same after the removal of the uterus or after the use of radium or when one or both ovaries are removed in women over forty-five years of age. To a large extent the symptoms of artificial menopause depend upon the nervous stability of the patient.

12. Pain in the lower portion of the abdomen frequently follows the use of radium which lasts anywhere from six to eighteen months.

13. The use of radium is definitely contraindicated in patients suffering from submucous fibroids, sloughing of endometrium or even pyometria is likely to take place.

Uterine bleeding of nonmalignant origin is probably the most frequent symptom the gynecologist is called upon to treat. No single method of treatment is applicable to all cases. Success in combating this troublesome condition depends upon the proper interpretation of the clinical signs and symptoms, both local and general, and then instituting a form of treatment that is least inconvenient or least dangerous to the life of the patient. The management of uterine bleeding

the cells to the well-known granulosa cell, and their common tendency to arrange themselves in small clusters or rosettes, sometimes incomplete and horseshoe shaped. There is likewise a tendency, especially in the diffuse types, to cystic degeneration, with the production of tiny

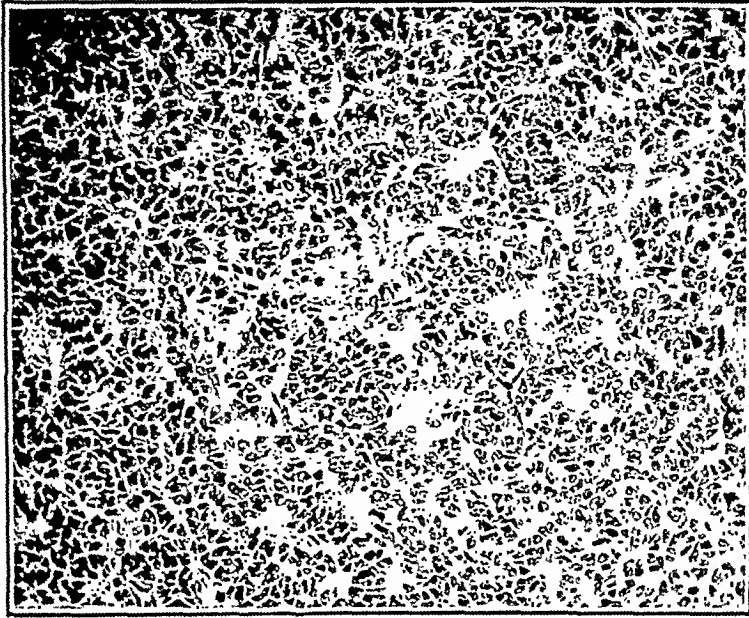


Fig. 2.

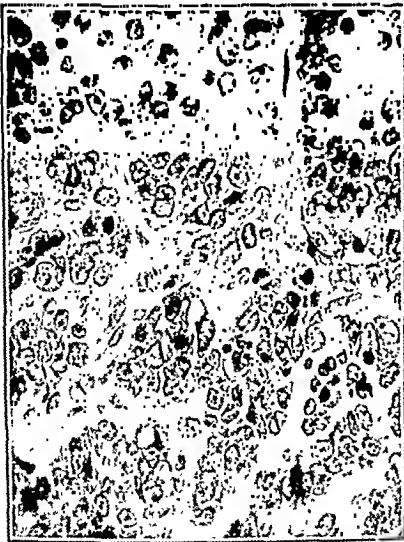


Fig. 3.

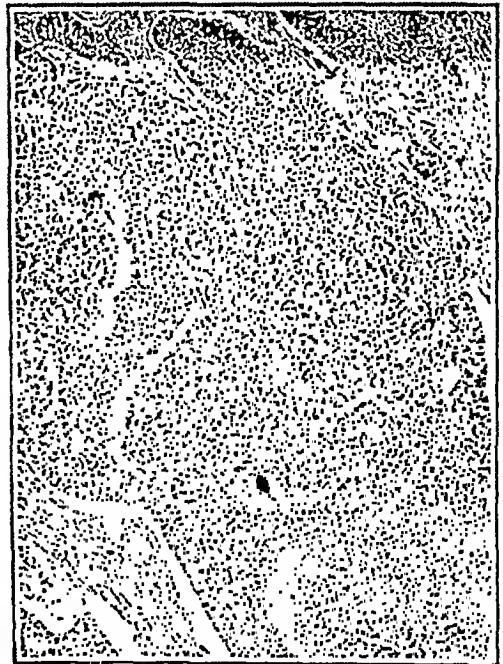


Fig. 4.

or somewhat larger cavities suggesting the Call-Exner bodies seen so characteristically in the granulosa of many animals, such as the rabbit.

To this general diagnostic point we must add the fact that the connective tissue elements play an important part in modifying the pat-

which are read by the general medical profession, as there is much confusion in the minds of the nongynecologic men about the methods of treatment to be used in uterine bleeding.

It is impossible to discuss all of the points mentioned. In a study of 2,000 consecutive gynecologic patients the symptom of bleeding was found in one-fourth of the patients. When the character of the bleeding was analyzed, we found that the most frequent bleeding was a profuse or prolonged menstrual flow. This occurred in about 60 per cent of the cases. In 20 per cent the menstruation occurred too soon, and we may conjecture that the too frequent menses are due to some abnormal function in the ovulation process of the ovary. In another 20 per cent menstruation was entirely irregular and might properly be termed metrorrhagia. The latter results from the loss of continuity of the surface epithelium. About 23 per cent of these patients with metrorrhagias had uterine carcinoma.

Every patient should be carefully studied to find the cause of the functional bleeding. Medical treatment is invariably instituted, first because a great number of such cases are due to an endocrine dysfunction. About one-third of such patients may be benefited by endocrine or medical treatment. If endocrine or medical treatment does not help, one should resort to curettage. Another one-third of these functional bleedings are arrested thereby. If the hemorrhage, especially in younger people, should recur, we do not hesitate to repeat the curettage. Finally, one-third of the entire group of functional bleeding remain, that require radium therapy. The patients are placed in age groups. The first group is the adolescent group, comprising patients twenty years old or younger; the second group is the mature group, from twenty to forty years old; the third group is the climacteric group, forty to fifty years old; and the fourth group is the senile, postmenstrual group in patients fifty-one years or older. Radiations are used mostly in the third and fourth groups.

Dr. Rongy spoke of the occurrence of pain and leucorrhea following radiation therapy. These complications can be prevented either by the use of roentgen therapy, with which the time of treatment may be reduced to thirty to forty-five minutes, or by the use of radium, which is placed in a Y-shaped brass filter, so that the areas at the fundus receive the cauterizing effect of the Gamma rays, and not the region of the internal os. Injury of the internal os may lead to scar tissue formation and stenosis. Retention of the uterine secretions then causes pain.

DR. EMIL NOVAK, BALTIMORE, MD.—Unfortunately, Dr. Rongy did not have time to do more than merely mention, perhaps, the most interesting type of bleeding, the so-called functional variety, so that it would scarcely seem proper to include this in the discussion. In presenting his classification of types, he distinguished a functional and a menopausal type. I do not see why he makes such a subdivision, as by menopausal bleeding he evidently indicates merely the type of functional bleeding noted at or near the menopausal age. It would seem no more entitled to separate distinction than the functional bleeding of puberty.

In speaking of inflammatory causes of bleeding, which are not numerically very important, he describes a case in which pregnancy supervened some time after a pyosalpinx was diagnosed. The inflammatory cases in which the prognosis for future pregnancies is least unfavorable are the postabortive or puerperal varieties, in which the streptococcus or staphylococcus are most frequently the causative organisms. The reason for this lies in the fact that these organisms attack the tube by way of the lymphatics rather than by the mucosa, which often is quite intact even in tubes enormously enlarged by interstitial inflammation, so that the lumen is likely to remain patent. The gonococcus, on the other hand, begins as an endosalpingitis, with frequent destruction of the mucosa and usually blocking of the lumen.

under one head. This applies even to the so-called "thecoma," which Löffler and Priesel, Melnick and Kantner, and more recently Geist have stated should be considered a separate variety of tumor. In the discussion of Geist's paper at the recent meeting of the American Gynecological Society one of us (Novak) took issue with this viewpoint, especially because of the common origin of granulosa cell cancer and thecoma from the same tissue, the ovarian mesenchyme. It was also suggested that a better name for the entire group would perhaps be "progranulosa cell cancer."

There are many other aspects of this tumor group which invite discussion, such as the small but interesting group in which partial or even complete lutein-like transformation of the granulosa cells appears to have taken place. We have recently studied two additional cases in which parts of what were unquestionably granulosa cell tumors showed this lutein-like transformation of the cells. We have discussed this particular point in our previous paper, and shall not elaborate on it here. We may add that the reprints of this previous paper (though not the paper as abbreviated for publication) contain illustrations of the various types which have been described, so that only a few will be included in this paper, in spite of the fact that slides have been utilized in illustrating all the types for this presentation.

ARRHENOBLASTOMA

Contrasted with the feminizing type of tumor is a group which produces the opposite effect of defeminization and even actual masculinization of greater or lesser degree. The logical starting point in the study of this variety of neoplasm would seem to be the case reported by Piek in 1905 and designated as "adenoma ovarii testiculare." This growth was originally explained by Piek as representing an adenoma developing in the testicular portion of an ovotestis, but Meyer has objected to this explanation because there was no history of intersexual manifestations before the development of the tumor. The studies of Meyer have led him to assign to the testicular adenomas of the type described by Piek a place in a group of tumors of widely differing histologic structure, but all tending to produce defeminizing or masculinizing effects.

At one end of the group are these highly differentiated testicular adenomas. At the other are the highly undifferentiated group, which resemble sarcoma, and in which only careful search will reveal any evidence of epithelial tubules. Between the two extremes is Meyer's intermediate group, in which the nature of the tumor is usually readily discernible because of the presence of varying numbers of tubules and acini. The more undifferentiated the tumor type, the more constant the biologic effects above mentioned, while in the testicular adenoma only one-third of the reported cases have produced any degree of masculinization change.

VESICOVAGINAL FISTULA*

MANAGEMENT AND END-RESULTS

LOUIS E. PHANEUF, M.D., Sc.D. (HON.), F.A.C.S., BOSTON, MASS.

WHEN J. Marion Sims operated for the thirtieth time on his patient, Anareha, in May, 1849, and successfully closed her vesicovaginal fistula by means of silver wire sutures, a new era was opened in the treatment of this distressing condition. Vesical fistulas have decreased in frequency with the improvement of obstetric practice, yet the accident occurs occasionally, even at the present time. If the obstetric fistulas have decreased, the surgical injuries of the bladder, resulting in fistulous openings, have increased because of the greater number of surgical interventions involving the pelvic organs, which are practiced today. In order to gain some idea of the incidence of vesicovaginal fistula, I have reviewed the last 10,000 consecutive gynecologic and obstetric histories of my own patients and have found ten of these lesions in the group, an incidence of one in one thousand.

Most fistulas, due to the trauma of labor, are caused by pressure necrosis and sloughing rather than by forceps cuts or lacerations of the tissues, although it is true that in most of these cases the labor was terminated instrumentally. Etiologically, the disorder is due to the fact that the forceps were used after a long labor, when necrosis had already occurred, rather than when they were used too early. In some instances the bladder may be ground against the pubic ramus of one side or the other by the forceps. Surgical vesicovaginal fistula may be the result of injury to the bladder during certain operative procedures, as panhysterectomy, abdominal or vaginal. Operations for the cure of cystocele and uterine prolapse, such as vaginal fixation of the uterus, the interposition operation and less extensive interventions on the anterior vaginal wall and bladder, may also be responsible for a definite number of these lesions. Surgical obstetric methods like the vaginal cesarean section may account for a few of these disorders. Two factors are responsible for the production of surgical fistulas: first, direct operative injury, and second, necrosis and sloughing due to interference of the blood supply of a local area of the bladder. When due to operative injury, the fistula appears soon thereafter; when due to necrosis and sloughing, a number of days elapse before urinary leakage is apparent. Syphilis, tuberculosis, and carcinoma,

*Read at the Forty-Eighth Annual Meeting of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons, Skytop, Pa., September 16 to 18, 1935.

In association particularly with the undifferentiated types of arrhenoblastoma, evidences of positive masculinization are commonly added to those of defeminization. The voice becomes heavy and masculine, the body contour and even the skeleton may become masculine, and the clitoris may exhibit marked hypertrophy, even to penis-like proportions. That these phenomena are actually due to the presence of the tumor is indicated by their disappearance after removal of the growth, though some residue of symptoms may be left.

In addition to a case of our own which has been previously reported by Novak and Long, we have had the opportunity of studying tissue, usually many blocks, of three other cases of this rare tumor. The size of the tumors is very variable, and they have been unilateral in all reported cases. While they are solid, they frequently show extensive degeneration, which may result in the formation of many small or large cystic cavities.

The rare testicular adenoma should be easy to recognize because of its resemblance to the normal seminiferous tubule structure of the testis. We have seen no case of this variety. In the other varieties one sees large fields of sarcomatous appearance, but in the intermediate group there is no difficulty in finding the tubular structures which give the clue to diagnosis. In some cases these are well marked, with wide lumina, in others they appear as small, almost indistinguishable lumina, while in still other areas one may see zig-zag solid cords of cells which are reminiscent of the early sex cords. In a few cases, as in two of those which we have studied, one finds cells which resemble and perhaps are interstitial cells, although the confusion between these and the chromaffin or paraganglion cells at times seen in the ovarian hilum makes such an interpretation uncertain.

DISGERMINOMA (SEMINOMA)

This neoplasm, the seminoma of the French authors (Chevassu) and the "grosszellige Karcinom" of the Germans, is being reported with increasing frequency, possibly because its pathologic recognition is comparatively simple. This, in turn, may be explained by the fact that its microscopic structure is not subject to the protean variability which characterizes the other neoplasms of this general group. It is only about one-third as common as the granulosa cell cancer. The designation applied by Meyer, disgerminoma, would seem a very fitting one in view of his explanation that these tumors arise from cells which have strayed off from germinal paths and potencies in an early undifferentiated phase of ovarian development. Tumors arising from such disgerminal and sexually indifferent cells would be expected to exhibit no influence upon sex characters, and such is the case.

Until recent years, however, there was considerable confusion on this point, because of the fact that disgerminoma is so frequently encountered

colpocleisis. (B) The intravesical operation through a suprapubic incision, best illustrated by the method of Hugh H. Young. (C) The suprapubic extraperitoneal operation through a Pfannenstiel incision. (D) The intraperitoneal operation through an abdominal incision (Legueu operation). This is especially useful in fistulas consecutive to abdominal panhysterectomy. (E) Implantation of the ureters in the rectum (Coffey technic).

Ward and Farrar have devised ingenious methods for the closure of extensive vesicovaginal and urethrovesicovaginal fistulas.

In my 10 vesicovaginal fistulas the accident was due to obstetric causes in 4, to obstetrical-surgical causes (vaginal cesarean section) in 1, and to surgical causes in 5. Four of these fistula cases (1, 3, 4, and 6) occurred in my hands, while the 6 others occurred in the hands of other surgeons. Twenty-seven operations were necessary to close these 10 bladder fistulas; of these 8 were performed by others and 19 by me. I was successful in closing 9 of these fistulas while the tenth was closed by another surgeon after I had failed in the first attempt by the classical Sims operation. In these 10 cases, 1 fistula was closed by the suprapubic extraperitoneal method, after failing by the suprapubic intravesical and vaginal procedures. No fistula was successfully closed by the intravesical method which was used four times, although in one instance the patient had remained dry for two months after its performance. The vaginal method was responsible for the closure of 9 of the fistulas and the suprapubic extraperitoneal method for 1.

REPORT OF CASES

CASE 1.—Mrs. J. H., forty-six years of age, was operated upon by me at the Carney Hospital for a large cystocele, rectocele, and hemorrhoids on July 16, 1920. The interposition operation was performed for the cystocele, a median flap perineorrhaphy for the rectocele, and the hemorrhoids were removed by the clamp and cautery method. She obtained a good result for these operations except for the fact that a small vesicovaginal fistula developed in the region of the upper stitch, which attached the uterus to the vaginal wall. On Aug. 31, 1920, the fistula was closed by the classical Sims operation, using silver wire sutures. Healing took place by first intention and the patient was discharged cured.

CASE 2.—Mrs. J. McE., forty-seven years of age, had had an abdominal panhysterectomy performed in her home city at Prince Edward Island. She was admitted to the Carney Hospital with a large incisional hernia and a vesicovaginal fistula which was found in the line of healing of the vaginal cuff and which readily admitted the thumb. The bladder was contracted. On Nov. 1, 1920, the vesicovaginal fistula was pared and closed in one layer with silver wire sutures by the Sims technic. The incisional hernia was then repaired. A good result was obtained for the hernia but only about one-half of the fistula healed. On Dec. 16, 1920, the edges of the remaining fistulous tract were pared and closure was accomplished with silver wire sutures in one layer. An excellent result was obtained at this second operation and the patient was discharged cured.

CASE 3.—Mrs. D. B., forty-five years of age, was operated upon by me at the Carney Hospital on Feb. 6, 1926. The diagnosis: menorrhagia, metrorrhagia,

tendency to degenerative change, and areas of hemorrhage are often seen. The tumors are unquestionably malignant, but the degree of malignancy, like that of other members of this general group, is certainly less than that of ovarian cancer in general. As compared with granulosa cell cancer, recent reports by Kjaften and others would seem to leave little doubt that, taken as a whole, the dysgerminoma is the more malignant tumor. While this paper includes no discussion of treatment, it may be added that the dysgerminoma, like the granulosa cell carcinoma, is definitely radiosensitive, so that certainly in the advanced stages, where there is likely to be extensive infiltration and therefore incomplete operation, postoperative radiation is always indicated.

BRENNER TUMORS

Finally, brief reference may be made to the so-called Brenner tumor, first described by Brenner in 1907 under the name of "oöphoroma folliculare," and at first incorrectly confused with the granulosa cell tumors. Even now this mistake is sometimes made, though there is little excuse for it, because of the fact that both the clinical and the pathologic characteristics of the two neoplasms are quite different. As mentioned in the early part of this paper, the histogenesis of the Brenner type of tumor is believed to be from the so-called Walthard cell nests found not infrequently on the surface or in the cortex of the ovary. The cells in these nests are apparently of an "indifferent" type, and when they occur in the form of solid nests, like clumps of squamous epithelium, they resemble closely the nests of cells so characteristic of the Brenner tumor. Walthard, in his original paper, stated that the tubular or acinous type of nest may exhibit a mucoid transformation, and this likewise fortifies the belief that such cell collections may explain the histogenesis of Brenner tumors, for, as we shall see, a mucoid type of epithelium is often observed in these growths.

It is chiefly in elderly women that the Brenner tumor has been observed, though there are some exceptions. The symptoms do not differ from those of ovarian tumors in general, no such special biologic effect being attributable to the tumor cells, as is seen with the granulosa cell carcinoma or the arrhenoblastoma. The real nature of the growths, therefore, is not determinable until the pathologic examination is made. While the tumors are rare, there is no question that they are more frequent than the literature would lead one to expect, for their real nature is often overlooked, as we shall presently discuss. They are essentially benign, only one instance (Tavildoroff) of recurrence having been noted.

Until recent years the term Brenner tumor referred only to solid growths, usually rather small, and characterized by nests and columns of large, clear, uniform cells, in a stroma which is markedly hyperplastic, so that it often appears extensively fibromatous. Often there is a mucoid or colloid liquefaction of the epithelial cells, so that there may be a

transverse denudation was made around the fistula, dissecting out a cuff of vaginal mucosa and the edges of the vagina around it. The vaginal cuff was sutured over the opening by a continuous stitch of No. 0 chromic catgut, thus forming a plug of denuded vaginal mucosa directly over the fistula. The undermined edges of the vagina were approximated over this with eight silver wire sutures. Urinary leakage occurred after six days. The fourth operation was performed on July 8, 1930, and consisted of a suprapubic intravesical closure. She was well for three days when urinary leakage recurred. The fifth operation was performed on Feb. 9, 1931, and consisted of a suprapubic extraperitoneal closure. A transverse abdominal incision above the symphysis was made, cutting across both recti muscles and exposing the bladder extraperitoneally. The bladder was separated from the right pubic ramus and from the vagina, the adhesions being very firm. The right uterine artery, which was completely exposed, was ligated at its origin and cut. The right ureter was dissected for about two inches (5 cm.) up to its entrance in the bladder, so as not to tie it during closure. The bladder opening was about 3.75 cm. by 2.5 cm. The vaginal wall was closed with interrupted sutures of No. 2 chromic catgut, which did not penetrate the surface vaginal mucosa. The scar tissue at the edges of the bladder opening was resected. In the dissection the superior surface of the urethra was exposed and opened. A self-retaining catheter was introduced in the bladder, through the urethra, and the superior surface of the urethra closed over the catheter for an area about one inch (2.5 cm.) in length by mattress sutures of No. 2 chromic catgut. The bladder opening, after resection of the scar tissue around its edges, was about 1.6 by 1.2 inches (4 by 3 cm.), and was triangular in shape with the apex at the urethral opening. It was closed with interrupted sutures of No. 0 chromic catgut. The first layer of sutures was covered over by the bladder muscularis, using a running stitch of the same material. At the completion of operation the vaginal and bladder openings were far apart. The abdominal incision was closed in layers with drainage. The large bladder fistula healed successfully but necrosis set in in the dissected portion of the right ureter and a small ureterovaginal fistula appeared. At the time of this last operation pregnancy existed. This had not even been suspected, since it was thought that the marked incrustation of the vagina made coitus impossible, and since she had stated that she had had a regular period twelve days before entering the hospital. She went through the pregnancy uneventfully except for the leaking of a small amount of urine from the fistula of the right ureter. On Aug. 18, 1931, she entered the hospital after four hours of labor. Because of her generally contracted pelvis and the scar tissue in the region of her bladder, she was delivered by a classical cesarean section of a female child. On the fourteenth postoperative day her abdominal incision separated and a loop of ileum was extruded. Under spinal anesthesia the loop of ileum was reduced and the incision was closed with through-and-through silkworm gut sutures. Both mother and baby were discharged in good condition after this operation. The sixth operation was performed on Jan. 23, 1932, and consisted of the implantation of the right ureter in the fundus of the bladder. This healed successfully and stopped all leakage. On June 24, 1932, intravenous urograms were made by Dr. Roger C. Graves of the Urological Department of the Carney Hospital. The right renal pelvis and right ureter were not outlined, suggesting a lack of excretory function on that side. The left kidney outline looked a little larger and decidedly larger than the right kidney shadow. This represented some compensatory hypertrophy on the left and perhaps some atrophy on the right. The patient was enjoying the best of health.

CASE 6.—Miss G. L., nineteen years of age, was operated upon by me at the Beth Israel Hospital for a solid carcinoma of the left ovary, which was diagnosed by a frozen section at the time of operation. A very simple panhysterectomy with

Not only, therefore, may the Brenner tumor occur as an isolated solid tumor, but it may be submerged in a fibroma, often partly cystic. Many such cases have already been reported, mostly under Frankl's designation of fibroma ovarii adenoeysticum. This term is not fancied by Meyer, as it stresses the stromal rather than the more characteristic epithelial elements. To Meyer, too, we are indebted for the observation that the epithelium of the Brenner nests may undergo pseudomucinous differentiation, so that it exactly resembles that of the well-known pseudomucinous cystadenoma. As a matter of fact, one type, though not, of course, the most common one of pseudomucinous cystadenoma originates in Brenner tumors. In such cases the cystadenoma will reveal in some part of its wall a dense hardened area which on microscopic examination is seen to be a Brenner tumor. Not only pseudomucinous, but also serous cystadenomas may thus arise from Brenner tumors, because of the varied differentiating possibilities of the epithelial rests from which these tumors arise.

It will thus be seen that our concept of Brenner tumors must be greatly broadened, so as to include not only the pure type of solid tumor, but also the type associated with cysts of one type or another, often so large that the Brenner tumor is almost completely submerged. The study of cystadenomas must, therefore, include a proper consideration and search for this factor, which is so easily overlooked.

SUMMARY

From the very broad field so briefly and incompletely summarized in this paper, we may select a few points of especial interest and importance to the gynecologist and the pathologist, viz:

1. The granulosa cell carcinoma is relatively frequent, and, since its recognition is usually not difficult, there should be a sharper lookout for it in laboratories of pathology than has hitherto been the case.

2. While precocious puberty may be due to various other endocrine lesions, the occurrence of this syndrome in association with an ovarian tumor should at once lead to the suspicion of granulosa cell tumor, and this suspicion will usually be proved correct.

3. When enmetrage in cases of uterine bleeding occurring in women long after the menopause yields a typical endometrial hyperplasia, a granulosa cell carcinoma should be suspected even if, as in very stout patients, it cannot be felt. If a tumor can be palpated, the suspicion becomes almost a certainty.

4. During reproductive life, the symptoms produced by granulosa cell cancer, aside from those of ovarian tumors in general, are like those characterizing the more common type of hyperestrinism. Menstruation is usually excessive, often irregular, sometimes normal, while long periods of amenorrhea are not uncommon.

be located just below the opening of the left ureter. She was operated upon at the Carney Hospital on July 10, 1933. A catheter was introduced in the left ureter through the urethra and a Schuehardt incision was made on the left side. The fistulous opening was denuded and two vaginal flaps were formed. The scar tissue was resected around the margins of the fistula. The bladder opening was closed in two layers, using continuous sutures of No. 0 chromic catgut, and the edges of the vaginal wall were approximated with five silver wire sutures. Urine ran out of the left ureteral catheter after the closure. This operation, however, was unsuccessful, urinary leakage taking place soon thereafter. On Aug. 28, 1933, another attempt was made, resorting to the suprapubic intravesical method. A Pfannenstiel incision was made, the bladder was exposed, and the peritoneum was reflected superiorly. The bladder was opened in the median line; the fistula was found in the floor of the bladder, 0.5 to 0.8 inches ($1\frac{1}{4}$ to 2 cm.) below the left ureteral opening, and contained a great deal of granulation tissue. The granulations were curetted away, the edges of the fistula were pared, the vagina was closed with four interrupted sutures of No. 2 chromic catgut, the vesical opening with five interrupted sutures of the same material and the bladder mucosa with a running stitch of No. 0 plain catgut. The bladder was closed around a suprapubic No. 28 Pezzer catheter and the abdominal incision was closed in layers. Healing took place satisfactorily, the patient was dry for two months and was discharged as cured. Shortly thereafter she reported again and urinary leakage from the old fistula was discovered. On March 16, 1934, she was operated upon for the third time. The Schuehardt incision was reopened and the fistula was discovered to the left of the cervical stump near the left pubic ramus. A midline incision was made in the anterior vaginal wall, a right flap was dissected, the left flap was dissected with great difficulty because of scar tissue. The bladder opening was closed in two layers, the first consisting of interrupted sutures of No. 2 chromic catgut, burying the bladder mucosa within the bladder, and a second layer of muscularis was approximated with a running suture of the same material, burying the first. The vaginal wall was united with seven sutures of silver wire. The patient was kept on her abdomen for the first ten days, then alternating between her abdomen and her back until the indwelling catheter was removed on April 6, the twenty-first postoperative day. The silver wire sutures were removed on April 20, 1934. There was no leakage at any time following this third operation. She was examined in June, September, and December, 1934; she was free from symptoms and in excellent health.

CASE 10.—Mrs. O. L'R., forty-five years of age, had a large vesicovaginal fistula extending from the urinary meatus to the cervix, following a version and breech extraction for a hydrocephalic child done in a neighboring city. Three previous unsuccessful vaginal operations had been performed by another surgeon. The bladder was markedly contracted and its walls were thickened. On Feb. 2, 1934, she was operated upon at the Whidden Memorial Hospital, Everett, Massachusetts. The fistula was freed on all sides, two flaps of anterior vaginal wall were dissected and the bladder was well mobilized. The bladder was sutured in two layers using continuous sutures of No. 0 chromic catgut. The posterior wall of the urethra, which was involved in the fistula, was reconstructed over an indwelling catheter with interrupted sutures of No. 0 chromic catgut. The scar tissue at the edges of the vaginal flaps was resected and the vaginal wall was approximated from urethra to cervix with ten silver wire sutures, which were removed on March 6, 1934. There was no leakage whatsoever after operation. The patient was examined in June and September, 1934. At the last examination it was noted that the bladder capacity had increased considerably and that she had good urinary control.

But one case of arrhenoblastoma is found in our series and the history is unsatisfactory and the architectural characteristics are not completely convincing. Taylor states that up to June, 1933, only 26 cases had been reported. (Surg. Gynec. Obst. 56: p. 1040.)

The hormone influence in malignancy of the ovary is most interesting. Does the estrogenic substance when excessive and combined with hereditary factors dispose to malignancy in Müller's tract and the mammary glands, or is it tumor tissue function that causes estrogenic excess?

The group of tumors discussed by Dr. Novak owe their production in all probability largely to defective chromatin which is germ cell linked, but appears anatomically in deficiencies of the gonadal soma cells, physiologically and pathologically in the endocrine system and in gonadal tumor formation.

DR. HENRY SCHMITZ, CHICAGO, ILL.—Rowntree and others, some years ago, described tumors which had the same effect of masculinization in females as the arrhenoblastomas. Probably these tumors arise from an inclusion of undifferentiated gonad cells in the early stage of the development of the embryo, so much so that in the suprarenal tissue an inclusion of either male or female sex cells occurs which later on give rise to these masculinizing tumors. Hence if tumors are not found in the pelvis one should think of the suprarenal glands.

DR. NOVAK (closing).—Dr. Davis speaks of the rarity of these tumors. This applies to most of the types I have discussed, but not to the granulosa cell variety. The figures given in my paper, of which I have been able to give only a short synopsis, indicate that something like 10 per cent of primary ovarian cancers belong to this group, so that they cannot be considered rare. Next most frequent are the dysgerminomas. When pathologists learn to recognize these various types of special ovarian tumors, they will be reported with far greater frequency. Brenner tumors, for example, have commonly been overlooked or wrongly diagnosed, usually as granulosa cell cancer. As Dr. Davis says, and as I emphasized in my paper, blocks should be made from as many parts of the tumor as possible.

To explain the sex differentiation anomalies associated with arrhenoblastoma, I do not believe it is necessary to assume the inclusion of suprarenal tissue in the ovaries. As a matter of fact, aberrant suprarenal tissue is almost never found in these organs. A more rational explanation lies at hand in the intimate embryologic relationship between the suprarenal cortex and the ovarian medulla. The two "anlagen" are adjacent and practically continuous, so that it is not strange that tumors of the suprarenal cortex and certain tumors of the ovarian medulla, the arrhenoblastomas, produce closely allied effects. Finally, as I have mentioned in this paper and more fully discussed in a previous one, hirsutism per se is not to be looked upon as unquestioned evidence of masculinization, though often seen in association with other more distinctive manifestations. It is not rare, however, to find even extensive hirsutism in patients who otherwise are typically feminine, who menstruate normally, and who perhaps bear many children.

and by the end of the third day adjacent necrosis occurs which by the end of a week has formed a distinct greenish layer around the catgut. Healing is delayed until the irritating foreign body and necrotic tissue are removed and replaced. If the catgut is near the skin, there is adjacent redness, swelling and edema. Catgut coming from the sheep and having had a high bacterial impregnation, is irritative to human beings and tends to produce an allergic reaction which is more marked in certain persons than in others. Silver wire causes no defensive or allergic reaction, it is noncapillary, does not transmit bacteria, and does not antagonize repair. Thus Sims succeeded when he adopted silver wire as a suture material.

Silver wire has certain disadvantages. It has a low tensile strength, it must be fixed by twisting, it cannot well be tied in a knot, and it may produce a disfiguring argyria. Nevertheless, it will heal in and become buried in a septic field. In recent years a so-called new noble metal, rustless alloy steel, has come into use. It may be drawn into very fine annealed wire, soft, nonirritating and strong, which can be imbedded in the tissues without reaction. It may readily be tied in a secure surgeon's knot and will heal in a septic wound without causing a sinus or discoloration. Thus we can use it to ligate vessels even in infected wounds and leave the ligatures or sutures in. I have found it, therefore, of particular advantage to do these operations without any catgut, using from a No. 36 to a 32 (B and S gauge) alloy steel wire as interrupted inverting sutures for the bladder, cutting the ends short. A second layer may be put in the vagina and the line of union staggered. We have found no calcareous deposit on wire sutures left for a year in the bladder and have even sutured the ureter, biliary ducts, and intestine with this same material. This very strong, fine, flexible wire has quite revolutionized our results in plastic operations upon mucous and contaminated surfaces.

DR. NATHAN P. SEARS, SYRACUSE, N. Y.—I was very glad to hear Dr. Phaneuf say that he has tried as many as six times in treating an occasional case before he succeeded. Often in our enthusiasm to close the fistula we give the patient the impression that it will heal the first time, and if it does not, she will not return.

I am disappointed that Dr. Phaneuf did not show any good results with the transvesical repair of fistulas. I collected 48 cases some years ago and had two successful ones of my own. The operation has been spoken of as Young's, but I prefer to give Trendelenberg credit for performing it successfully in 1883.

We make a mistake in the repair of any fistula if we do not sufficiently enlarge the opening, to get well beyond all of the scar tissue around the fistulous tract and get a good healthy tissue to bring together. Evidence of the poor healing of scar tissue is often seen in abdominal incisions, where we have had to go through an old scar, the new part of the wound will heal perfectly while, in the scarred tissue, healing will be slow and imperfect.

This paper was also discussed by Drs. Bland, Kennedy and Tovey.

DR. PHANEUF (closing).—The postoperative care of these patients is dependent upon four factors. The first is the use of the self-retaining catheter. A plain catheter may be as advantageous, but I have not tried it. Second is the placing of the patient on the abdomen, a method which I learned from one of our pioneer urologists, in order to divert the urinary flow from the suture line. I keep the patient in this position for about ten days. After a couple of days she does not seem to mind it very much. The third point is the irrigation of the bladder and the cleansing, reboiling and reinserting of the catheter should it become occluded. Finally, all these manipulations should be done by the operator himself and should not be left to a nurse in training or to a young interne.

The invagination of the fistulous tract into the bladder seems of distinct advantage in closing some of the fistulas higher up.

gans may gravitate toward the diaphragm, and there produce lesions and symptoms which together may be termed the genitophrenic syndrome.

CLINICAL OBSERVATIONS

Although gonorrhea is the most common pelvic infection in women, there are undoubtedly effusions which arise from a severe nonspecific pelvic peritonitis of sufficient volume to extend to the upper abdominal fossae. Rupture of a pyosalpinx of any nongonorrheal origin may cause the pus to reach the diaphragm; also ruptured ovarian cysts. These patients as a rule have been in the recumbent posture shortly before the attack or are forced to bed immediately after.

Extravasation to the diaphragm of blood from a ruptured ectopic pregnancy was described by Behan⁵ in 1914 and later by Dawes,⁶ Herzfeld,⁷ and others. Behan's observation with respect to the sudden onset of severe shoulder pains was unknown to me when I published my own observations in 1923. Repeated observations by many since then have confirmed that symptom-complex. But all were agreed that it was the presence of large amounts of blood within the abdomen extending from the pelvis to the diaphragm which was responsible for the pains in the shoulders.

However, the adhesions described by Curtis may be provoked by small effusions. Coincidental epigastric and shoulder pains may also be produced by pelvic exudates of inconsiderable amount.

The opportunity to make direct observations as to the actual extent and amount of exudate poured out during the acute stage of pelvic gonorrheal infection is seldom available nowadays because operations are rarely done for this condition when the diagnosis is clear, and mild attacks require no operative intervention. Therefore in most cases one has to depend upon clinical signs and symptoms.

A recent experience with a case of acute pelvic gonorrhea enabled me to note the clinical signs and symptoms from shortly after the onset to the complete subsidence of the attack. At the very beginning, pain was referred to the gallbladder region and to both shoulders. Muscular rigidity and tenderness were generalized but were most marked in the lower half of the pelvis. Both adnexa remained swollen and fixed after the fever and signs of irritation had subsided. The patient was not operated upon.* In this case I felt that the fluid exudate undoubtedly reached both subphrenic spaces provoking the subcostal and shoulder pains. On the right side, the attack simulated biliary colic; on the left side the "perisplenitis and perigastritis" if present were less characteristic, the pains referred to the left shoulder

*This patient was operated upon Oct. 2, 1935, eleven months after the acute onset of her pelvic disease. Both adnexa were completely embedded in adhesions involving the broad ligament and sigmoid.

One patient, a primipara, started in labor with a slight amount of bleeding and complained of constant discomfort whether she was having a pain or not. I suspected a beginning separation and inserted a Voorhees bag. As soon as it was expelled I delivered her by forceps. The baby was lost. As I look back on this case, it was unquestionably badly managed. It was one of the earlier cases, and at the present time I am sure that had I done a cesarean section the patient would have had a living baby.

The uterus in several of these cases acted badly but in no case was it necessary to pack. In this series of 13 cases the mothers were all discharged well, but 4 babies were lost.

The 3 other women in this group were all multiparas. One had a toxemia of pregnancy with a blood pressure of 160/90 and the slightest possible trace of albumin. She was a large, stout woman, in labor. The uterus was hard, tense, and approximately full term in size. A steady though slight trickle of bright red blood was present by vagina. She was in good condition. Her membranes were ruptured, the vagina was packed with gauze, and a tight Spanish windlass was put on and kept tight. She was then given minim doses of pituitrin every hour for ten doses. She gradually expelled the packing and delivered herself of a stillborn baby. The placenta came away at once with many large clots, and several of the clots were adherent to it.

The second patient had no toxemia. She was in active labor, seven months advanced, and bleeding. The uterus was hard, boardlike, and tender. The same procedure was followed with this patient, and she quickly expelled a stillborn baby. The placenta came away at once with many large blood clots. Obviously she had lost considerable blood and therefore she was transfused. Her convalescence was satisfactory.

The third patient was a multipara who was seized with a sudden, sharp, excruciating pain in the abdomen. Within half an hour bleeding began. She was sent at once to the nearest hospital, and when I arrived four hours later, the uterus was tense and hard, but not especially tender. The fetal heart was not heard. Rectal examination showed the head well down in the pelvis, and the os was very soft and dilated nearly three inches. Her blood pressure was 100/50 and her pulse was 100. She was taken at once to the delivery room, her membranes were ruptured, the cervix and vagina packed, and a tight windlass put on. Within two hours she pushed the packing out of the vagina and the head was in sight. I was about to deliver her when she began to complain of severe pain in the right groin running down the leg. She suddenly gave one gasp, vomited, and died. I immediately extracted a stillborn child. The placenta came away at once with many large clots. This patient had shown no toxemia, but before the membranes were ruptured she was catheterized and the urine was found to be solid with albumin. A month before, she had had a severe mouth infection which cleared up rapidly under appropriate treatment. It is interesting to note that one other patient also had a similar severe mouth infection.

Of this group delivered by vagina, 15 of the mothers were discharged well and 1 was lost. Nine of the babies survived and 7 died. What pathology would have been found in these uteri, had they been seen, is purely surmise, and what would have been the results had the patients been allowed to go on and deliver themselves is of course debatable. There was no autopsy on the one patient that died, but I feel that she had a massive embolus.

in some cases although the tubes are freely patent and there is no evidence of pelvic adhesions, the gas fails to produce shoulder pains and no subphrenic pneumoperitoneum is visible in either subphrenic space. It is difficult to explain this failure to produce a subphrenic pneumoperitoneum except on the basis of an obliteration due to supra-hepatic and possibly perisplenic adhesions. In such cases either the tubes have undergone satisfactory healing or there was some other type of subphrenic exudate not originating in the pelvis.

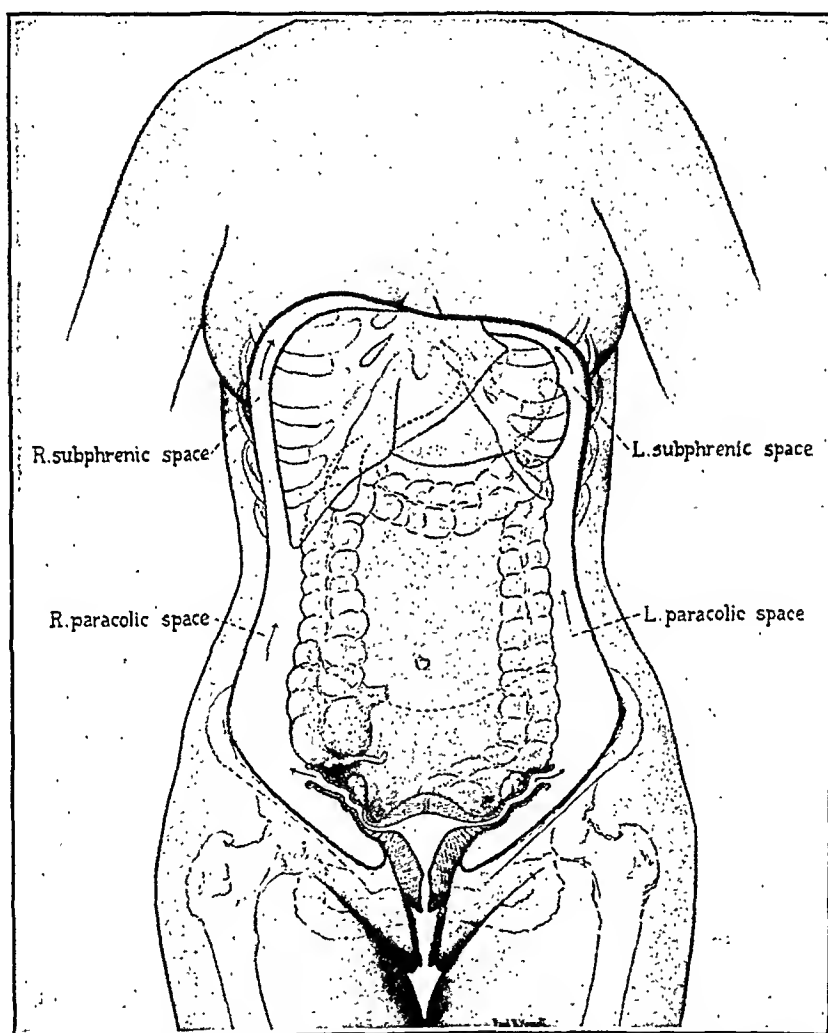


Fig. 1.—Diagrammatic illustration showing the paths taken by infective exudates and innocuous fluids arising from the female pelvic viscera in their upward extension toward the diaphragm.

In some instances of adherent and strictured but patent tubes, a left-sided subphrenic pneumoperitoneum is produced, but it is not possible to displace the gas from the left to the right subphrenic space. In these cases I was forced to assume the presence of adhesions between the diaphragm and the liver. As tubal strictures usually indicate a terminated pelvic infection, the absence of a right-sided subphrenic pneumoperitoneum following CO_2 insufflation points to subphrenic adhesions not otherwise suspected in the patient's history.

was partially separated, with a clot two by three inches retroplacental. This case might have been managed as well from below, for the fetus was an anencephalic monster.

There are many interesting points to be noted in this group, but there are four outstanding cases of which I want to speak further.

The first was a forty-two-year-old primipara in the last two weeks of her pregnancy. She had had a blood pressure varying from 120 to 130. She had shown no albumin and her general condition was excellent. She had had only three hours of labor when she began to have a considerable show of blood. The uterus was contracting satisfactorily, but because of her age and because she had a high presenting part, I elected to do a cesarean section at once. Upon opening the abdomen I found an ecchymosis in the midline of the uterus about the size of the palm of the hand, and on incising the uterus a blood clot presented with the placenta immediately beneath it. The placenta was about a third separated. The uterus was slow to react and my first suture in the uterus cut out, a thing which not infrequently happens in these ecchymotic uteri. The uterus acted satisfactorily before the incision was closed, and the patient made a perfectly satisfactory convalescence. The baby was also discharged well.

The second patient was eight and a half months advanced in her third pregnancy. She had had an absolutely normal pregnancy. Seven days after her last visit she had a sudden, profuse, painless hemorrhage which ran down her legs. She was sent at once to the hospital, where I met her. She was not in labor. The uterus did not have quite the normal resiliency. From my prenatal examination I knew the head was well down in the pelvis and I did not think that she had a placenta previa. She was catheterized and the urine was found to be solid with albumin. Her blood pressure was 170/100. I did a cesarean section at once. When I opened the abdomen the uterus presented typical ecchymotic spots running over to the right appendages, very little to the left, and there were ecchymotic areas on the posterior wall. The incision in the uterus bled but little, which in these cases is not uncommon. The placenta was on the anterior wall, partially off, with clots in the uterus. The baby was in marked asphyxia, but was resuscitated. The patient was transfused while on the table.

The third was a woman twenty-four years of age, eight months advanced in her second pregnancy. She had had during her pregnancy a troublesome anemia which was gradually but steadily improving. I saw her the day before, and she was then in excellent condition with a blood pressure of 104/60, no albumin was present, and she remarked that she was feeling better than she had felt before during this pregnancy. The next afternoon about two o'clock she telephoned saying that she had had slight discomfort during the night, no pain, and that for a while this discomfort would wake her up, but she had had on the whole a fair night. She was out of town, and I asked to have her local doctor see her. He telephoned me shortly after that there was no bleeding, that the uterus was a little firm, and that she was in excellent condition. I told him to send her at once to the hospital. I met her there, where she arrived in about two hours. At that time the uterus was firm and had begun to be slightly tender, but she was complaining of absolutely no pain, and she steadily denied that she had had any pain. When she arrived at the hospital there was no bleeding. She had a blood pressure of 96/58. A catheter specimen showed a heavy trace of albumin with granular and hyaline casts. I operated immediately and found ecchymoses, one to the left of the midline, and one to the right that ran nearly to the appendages. When the incision was made in the uterus the blood came out under pressure and several large clots were expelled. The placenta was completely separated and a stillborn baby was delivered. She also

the uterus turned to the left, somewhat enlarged and slightly fixed. The adnexa were not palpably enlarged. A third insufflation which I did Feb. 20, 1931, confirmed the diagnosis of closed tubes. She was operated upon Feb. 25, 1931, at the Beth Israel Hospital.

At operation, both tubes were found moderately dilated and markedly adherent to the ovaries and broad ligament. There were no signs of acute inflammation. Both

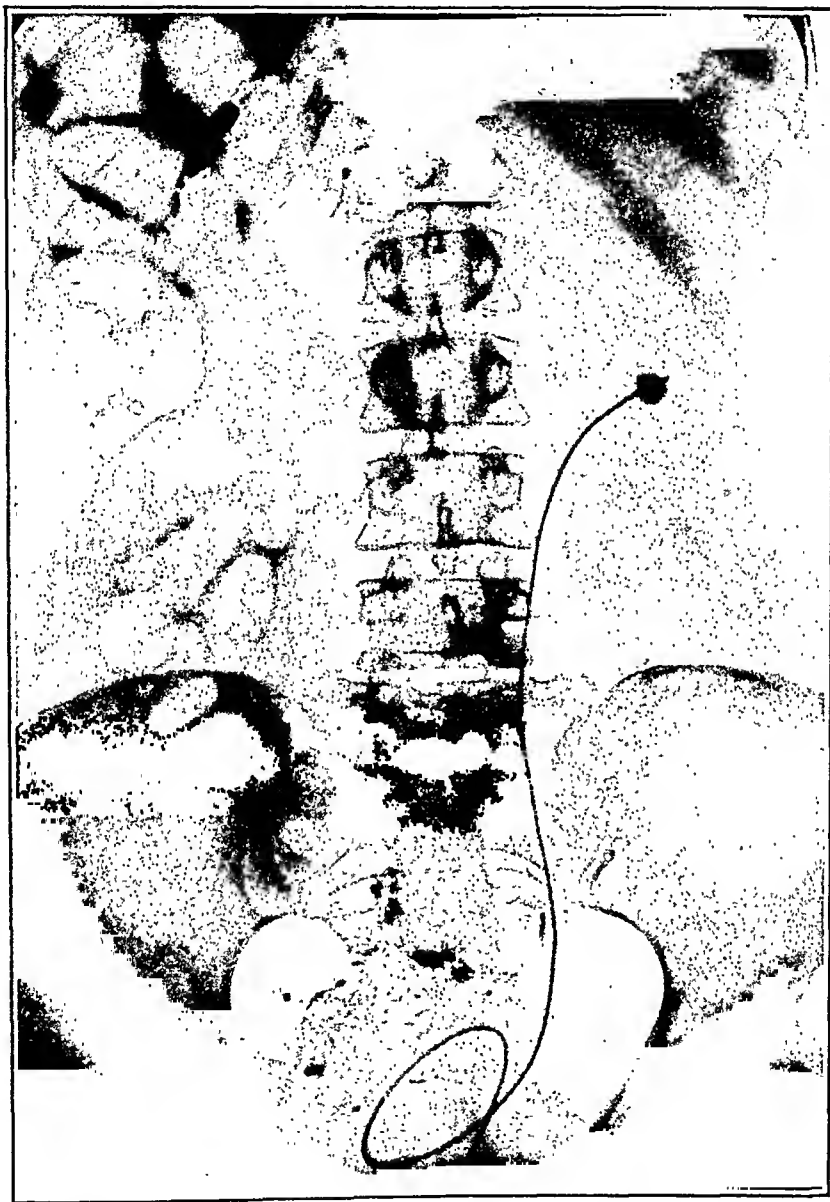


Fig. 3.—Skiagraph of the same patient three months later, an opaque ureteral catheter identifying a right renal calculus. The subphrenic collection is still marked; the pelvic lipiodol residue is somewhat less conspicuous.

fimbria were closed and puckered in. As the right ovary was completely cystic, it was removed with the corresponding tube. The left tube and ovary were freed from their adhesions, the ovary being more firm than cystic. The left fimbria were "milked" open, the newly formed stoma becoming wide enough to allow the passage of a number 14 French catheter into its lumen. Owing to the presence of slight oozing occasioned by mechanically freeing the fimbria, lipiodol was injected into the tube instead of air. The tube was seen to distend with the oil, as far as

that there were seventeen subsequent pregnancies in which no separations occurred, and that six of these were in patients who had had the severe type with ecchymoses present.

I admit I have been lucky in the outcome of these cases. Some of you may have as good results by treating such patients more conservatively. My object in bringing this series before you is to insist upon an early diagnosis and then individualization of the treatment. As the symptoms and signs vary, so will the treatment.

DISCUSSION

DR. JAMES R. McCORD, ATLANTA, GA.—During the past three years in our clinic there have been 4,972 deliveries at all periods of gestation. Premature separation of the placenta was diagnosed 28 times. In 3 of the 28 cases the diagnosis could not be positively differentiated from placenta previa. Antepartum vaginal hemorrhage was present in 23 cases. Albumin was found in the urine of 13 women. Hypertension was present in 20 cases. The eyegrounds of 12 women were studied; pathology was found in 5. A tight, irritable uterus was definitely described in 20 cases; in 8 cases it was not mentioned. Eight women were primiparas.

The 28 cases were arbitrarily divided as mild (11), moderate (11), and severe (6). Eleven women were at term. There were 10 babies born alive. These babies were delivered from the mild and moderate cases. Several of the babies were premature and their ultimate survival is doubtful. Twenty-six of the patients were treated expectantly. The membranes were ruptured 14 times as a method of treatment. A forceps operation was done on one woman and a breech extraction upon another. Abdominal delivery was not resorted to, nor was the vagina tamponed.

Two women died. In one the premature separation was complicated by eclampsia. The other patient refused an induction of labor two weeks earlier, signed a release, and left the hospital. She was readmitted with a premature separation of the placenta. Her death seemed to be caused by a congestive heart failure, and she died undelivered. Blood transfusion was done only three times. There is great difficulty in getting negro donors.

Premature separation of the placenta is often the most serious of obstetric complications, and in severe cases the maternal mortality will probably remain high. Radical treatment in experienced hands, coordinated with good judgment, will save the occasional case. However, it is my opinion that widespread dissemination of radical procedures in the treatment of this condition will do more harm than good. It would seem probable that the average patient, in average hands, should be treated along expectant lines—rupture of the membranes, vaginal tamponade, the treatment of shock and artificial delivery done only when imperative.

DR. ARTHUR H. BILL, CLEVELAND, OHIO.—Our treatment, whether with partial or complete separation, is active. We recognize no palliative, watching treatment. Our routine treatment is abdominal cesarean section. Where there is partial separation and where we have recognized the separation early, we have been able sometimes to save the child.

Dr. DeNormandie's list did not include many of the more tragic cases. They furnish the real problems of obstetric practice. There has been mortality in these cases in the past, and there still is mortality, I think largely due to the treatment. The teaching has been that the only way to stop the hemorrhage is to deliver and let the uterus contract. The doctors have been so impressed with this fact that they have often resorted to delivery when the patient was in poor condition. While the method of delivery is important, yet the condition of the patient is even more important. In evaluating this the external bleeding means very little, but we must be

from the corresponding tube as has been noted in a previous publication⁸ though this does not necessarily always follow. Nor is the Trendelenburg position necessary for the fluid to gravitate toward the diaphragm. The absence of adhesive peritonitis elsewhere may be due to the fact that the exudates are ultimately collected more abundantly in the subphrenic spaces where they are arrested and where the adhesions become more or less fixed. The rhythmic suction action of the diaphragm may account for the adhesions assuming the "violin string" variety. It is quite possible that these adhesions are ultimately resolved. They were not present eleven months after the initial attack of peritonitis in the case of acute pelvic gonorrhea described above.

SUMMARY AND DISCUSSION OF THE GENITOPHRENIC SYNDROME

The data accumulated so far point to lesions in the pelvis being capable of producing pain in the upper abdomen and the areas above, especially the shoulder girdle. Large extravasations as observed in ruptured tubal pregnancy cause the pain in the diaphragmatic areas by sudden impact or shock upon the terminal nerves of the diaphragm and the marked displacement of the liver. In such cases the blood may occupy, for the most part, the pelvis, hypogastric fossae, the lumbar gutters, and the subphrenic spaces. Small extravasations may, however, extend upward along one or both paracolic fossae and reach the diaphragm where pain may be elicited by a similar type of irritation. The nerve terminals of the diaphragm appear to be exceedingly sensitive to the presence of any foreign body including gas or air. Capps and Coleman¹⁰ have shown that slight pressure on the peritoneal surface of the diaphragm can set up pain of great intensity in the neck. They were able to demonstrate this experimentally by producing artificial pneumoperitoneum in some cases and in a few cases of spontaneously induced pneumoperitoneum as in ruptured gastric ulcer. By passing a silver wire through an abdominal trocar they succeeded, under fluoroscopic guidance, in irritating specific points of the parietal surface of the diaphragm and noting the corresponding areas sensitized in the shoulder girdle. It is of interest to mention in this connection that the air which they used would produce shoulder pains if the patient were allowed to stand up. In the recumbent position the referred pains are sometimes absent even though the volume is large.

Infective fluids may be assumed to be at least as irritant and may reach the upper abdomen from the pelvis in the same way as blood or gas. The exudate need not be large as has been demonstrated by lipiodol in amounts of 15 c.c. and less. The recumbent posture is sufficient to allow the fluid in this position to gravitate, as Coffey has

Many of these babies are born alive but the great danger to them is atelectasis, interference with the blood supply because of the pathologic condition of the placenta. We have adopted the method of administering carbon dioxide upon birth, giving complete aeration of the lungs. I believe in that way many babies can be saved.

DR. THADDEUS L. MONTGOMERY, PHILADELPHIA, PA.—In a study of the cases of premature separation of the placenta which occurred in our clinic at the Jefferson Medical College Hospital, I found that there were three etiologic factors present. The most conspicuous of these was toxemia, found in over 50 per cent of all the cases, and in 85 per cent of those which occurred before the onset of labor. The second etiologic factor was trauma. In one or two instances severe blows upon the abdomen were apparently responsible for placental detachment. The third etiologic factor was trauma in delivery, such as the partial separating of the placenta during the performance of internal podalic version, or extraction of the first baby in twins.

In many cases it is difficult to differentiate between marginal types of placenta previa and premature separation of the placenta. In the case of a low implantation of the placenta slight separation may occur as labor is inaugurated. The blood may accumulate between the placenta and the uterine wall, invade the uterine wall, and produce muscular spasm and hypertonicity, giving rise to a picture which resembles closely that of premature separation of the placenta. Upon careful examination of our history records, I found many instances in which this type of case occurred, and I felt at the time that they should be considered as instances of placenta previa.

It has been my experience that the frank case of placental detachment which occurs in instances of nephritic toxemia, which may appear at any time during the latter half of pregnancy, is best treated by abdominal cesarean section, unless the mass of the products of conception is so small and the cervix so easily dilated that one can rationally wait for, or consummate, delivery by the vaginal route.

Two points must be kept in mind if one is to perform cesarean section: namely that the patient must be prepared by intravenous instillation of fluid, either glucose or, better, blood transfusion, and that the operation itself is most safely done under local anesthesia, so that the already existing shock is not added to. Our mortality in this condition is one maternal death in some 25 cases. Of course, the fetal mortality is always, and will always be, very high.

DR. DENORMANDIE (closing).—It is interesting that no one here has spoken of manual dilatation in delivery of these cases. When I first recognized this condition, it was the routine treatment, and if we have given it up, it is a tremendous gain. In the hands of the general man without hospital facilities the conservative treatment is the best method, but when you have opened these patients and seen ecchymotic uteri you cannot be convinced that it is proper to wait and treat them routinely from below. I do not agree with Dr. Bill that transfusion should be done before delivery, and it was not done in any of my patients. Three of them were transfused on the table. All were ready to be transfused if necessary.

There was a question as to whether some of these cases were low attached placentas or not. I could not say absolutely but I do not think they were. They were all operative deliveries except three, and I did not feel the placenta in the lower segment in any of them.

What I particularly wished to stress is the individualization of the case, but not waiting and doing nothing. Treatment should be started at once—rupture of the membranes, a Spanish windlass, or some other measure. I do not think delay is justifiable.

be entered into at the present time. However, the size, form, mobility, and position of the sigmoid obviously influence the distribution of effusions arising from the tubes. The position of the cecum probably influences the escape upward from the right side of the pelvis. Larger effusions may ascend on both sides although originating from one adnexa. The exudate may spread upward on the opposite side only, owing to the presence of preexisting adhesions which act as barriers on one side or the other. In the absence of such adhesions, the exudate as a rule tends to follow the nearest abdominal gutter and reaches the corresponding subphrenic space.

The symptoms produced by reverse gravitation of infective fluids are pain in the right or left subcostal space or in both and are frequently referred to the gallbladder and the shoulders. Irritation of the diaphragm is conveyed via the phrenic nerves to the third, fourth, and fifth cervical cord segments from which arise the nerves supplying the shoulder girdle (Fig. 4). Salmon⁹ has called attention to dilatation of the pupil in ruptured tubal pregnancy and traces the effect via the same nerves. Pain in the right shoulder is frequently and more commonly noticed by the patient and by the physician. The right half of the diaphragm appears to be more sensitive than the left half and pain referred to the right shoulder is usually more sharply experienced under identical conditions as has been observed in thousands of tubal insufflations.

This is easily demonstrable by placing the patient on her left side and compressing the right ribs, thus converting a left-sided into a right-sided subphrenic pneumoperitoneum, and then comparing the pain reactions. Apparently the gas is more completely imprisoned between the diaphragm and the liver than between the latter and the stomach and spleen causing greater stretching of the falciform ligament.

The symptoms comprising the genitophrenic syndrome in women are as a rule met in acute conditions when they are traceable to their pelvic source. Whether chronic pelvic conditions produce this symptom-complex cannot at present be definitely stated. The fact that the symptom is manifested in anatomical areas as remote from the pelvis as the diaphragm and the shoulders, and even the pupils, should not be understood as a secondary effect of a focal infection. The extension is direct and intraperitoneal and reaches as far as the diaphragm where pain is radiated along the distribution of the phrenic nerve and may simulate subphrenic visceral disease and pulmonary and pleural disease as well. The symptoms disappear with the subsidence of the pelvic lesion which may be spontaneous or follow as a result of surgical intervention. So close is this pelvic-phrenic connection that one has to think of it in all instances (except local trauma)

quently unrecognized at the time of delivery, and only later is a relaxation of the pelvic floor noted. In other cases there is a frank laceration which extends only through the fourchet and the introitus vaginae, or the tissues may be divided down to the sphincter ani muscle, with damage to the transversus perinei muscles and the deep pelvic fascia. In more severe injuries the laceration may extend through the sphincter ani muscle and up the rectum for several centimeters. If the laceration in the midline extends up one or both sulci, through the levator ani muscles, the rectovesical and the ischiorectal fasciae, the support of the perineal floor is decidedly impaired, with a resulting rectocele. The damage to these structures may be low down at the side of the rectum or at the attachment to the white line, or on any plane between these points.

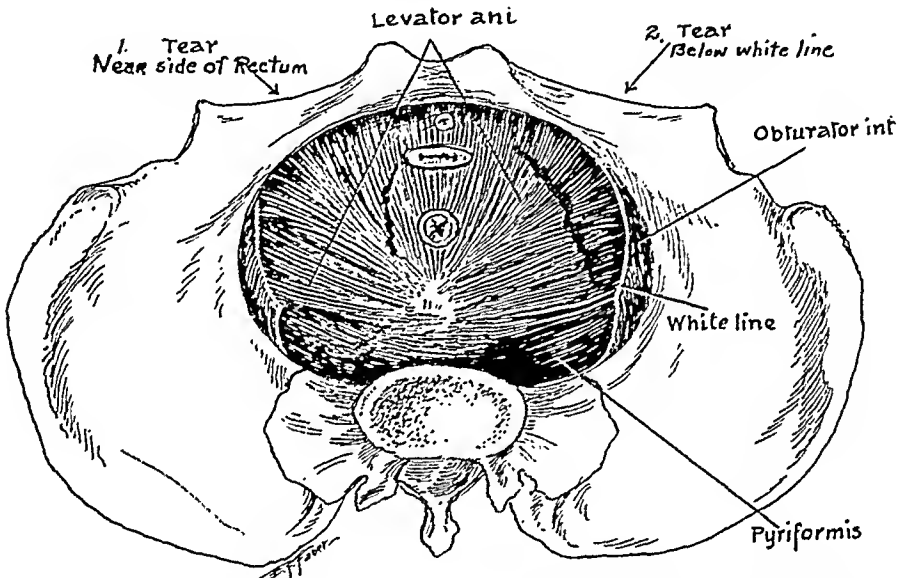


Fig. 1.—Muscular floor of pelvis. 1, Tear through the levator ani muscle near side of rectum. 2, Tear through the levator ani muscle below the white line.

If the uterus in these cases is in the direct plane of the pelvis and freely movable, a prolapse of this organ will develop in many instances.

The chief supports of the pelvic floor are the levator ani muscles, the rectovesical and the ischiorectal fasciae, supplemented by the transversus perinei muscles and the deep pelvic fascia. A patient may have, for many years, a laceration in the midline of the perineum down to the sphincter ani and up the rectum several centimeters, without a symptom from loss of support, due to the fact that the levator ani muscles and their fasciae have not been injured.

In many cases it is impossible immediately after delivery to determine whether a laceration of the cervix uteri is present and its extent. If present, its repair is not especially easy. For this reason most obstetricians are content to place a few stitches in a plainly visible midline laceration of the perineum, and leave other injuries to the tender mercies of nature.

of blood with each turn of the wheel eliminates many of the difficulties of transfusion as there is no delay, for the smallest blood supply in the venous lake of the arm will readily supply 1 c.c. at a time, and the use of small needles is possible so that dissection of the veins is very seldom necessary.

Many transfusions of 300 to 600 c.c. are reported in the literature. The purpose of this paper is to report our experience with large transfusions instead of multiple small ones. We have arbitrarily designated a massive transfusion as one that consists of more than 600 c.c. of blood,

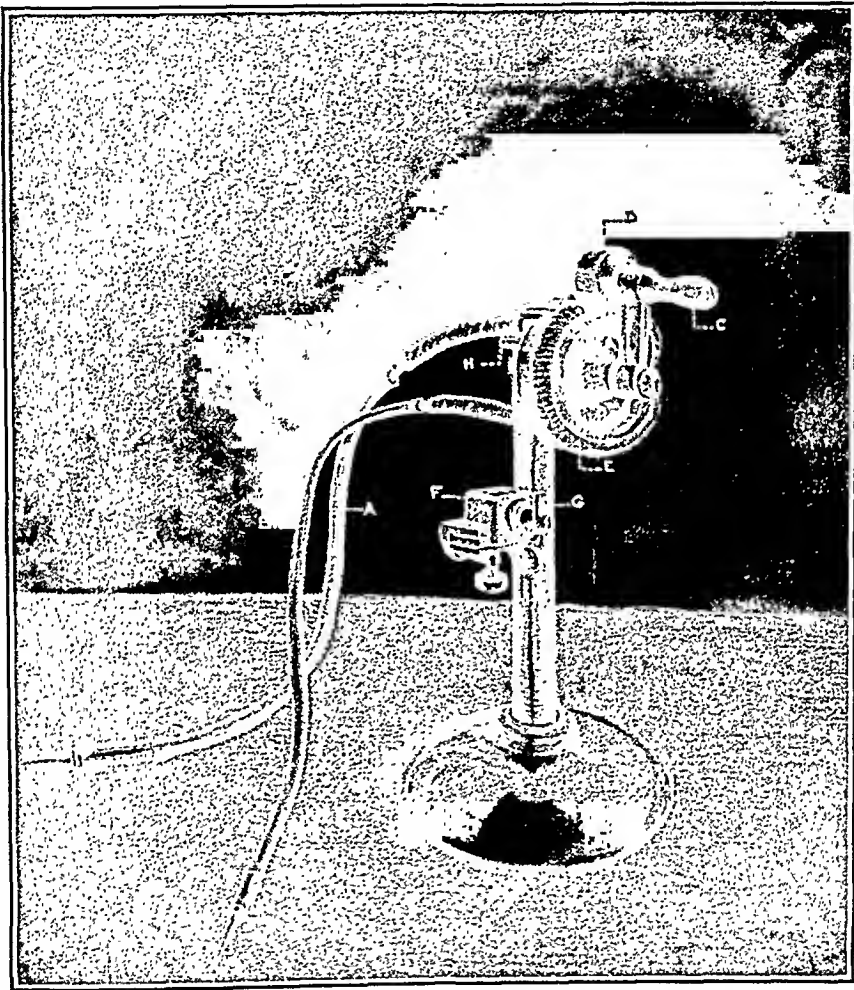


Fig. 1.—The Baker transfusion apparatus. Blood is drawn from donor's vein through a 16 to 18 gauge needle into thin-walled tube *B*, to compression tube *E* by milking action of roller *D* traveling over the compression tube pushed by handle *C*. The blood is in like manner expelled from the compression tube through delivery tube *A* through 18 to 20 gauge needle into the patient's vein. Each revolution delivers 1 c.c. of blood. The roller *D* trips lever *G* and records the revolution on counter *F*. The cam *H* is arranged to close the lumen of the compression tube to prevent back flow of blood while the roller passes the gap in the compression tube circuit.

and for these massive transfusions two or more donors are used. The reasons for using single large transfusions have been, first, that a single small transfusion is insufficient in certain cases, and second, when bloods are well matched, there is less danger of serious reaction in a single large transfusion than in repeated transfusions. In the literature attention

joy the same health as before conception took place. The economic and sociologic advantage gained by these patients in one rather than two hospital sojourns, is incalculable.

Intermediate repair is not of recent origin. Aleoek reported on intermediate perineal repair as far back as 1820. Many years ago, B. C. Hirst recommended intermediate repairs of all injuries resulting from childbirth.

The advantages of intermediate repair of these lacerations are manifold. The true extent of the damage to the pelvic structures can be

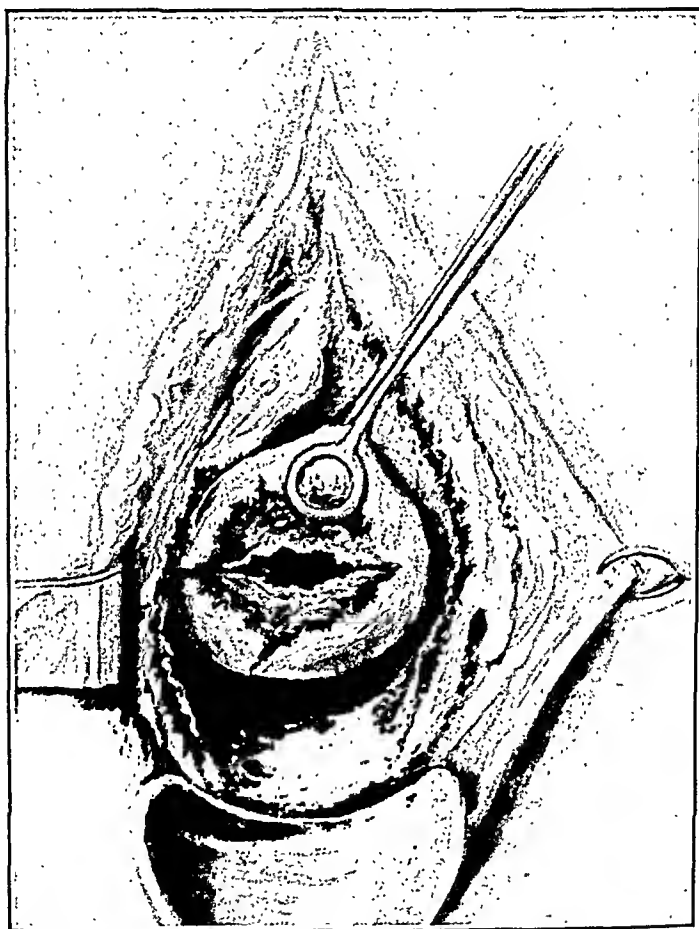


Fig. 3.—Laceration of cervix uteri, and laceration along both sides of vulva.

determined more accurately at this time; all lacerations wherever located can be sutured and the result of the operation on the perineum will be decidedly better than after the immediate operation.

If the patient has had a normal convalescence, intermediate repair is usually performed on the fifth day. In the presence of morbidity the operation is not attempted. The day before the operation the bowels are emptied well by a cathartic, and on the day of the operation by an enema. The patient is given no breakfast in the morning. She nurses her baby that morning as usual. Ethylene gas is preferred as

an increased blood volume and hemoglobin content over a period of time before operation. If the tumor is adherent or a difficult operation is expected, another transfusion is done during the operation.

If the anemia is moderate, 50 to 70 per cent hemoglobin, the transfusion is done only at the time of operation, and a large transfusion of 1,000 to 1,200 c.c. is given.

3. *In the treatment of shock or the anticipation of shock.* It is this group in which we are particularly interested. Blalock¹ has found that in prolonged low blood pressure from shock there occurs a capillary congestion of organs and increased permeability of capillaries with hemorrhage and loss of fluid into the tissues. Blood transfusion may be of no benefit then. It is too late. On the other hand, if bleeding from a large vessel is stopped, blood introduced into the vascular system will remain, but not so after it is being lost from numerous small vessels as a result of prolonged shock. We feel that the best time for transfusion for shock is as soon after its appearance as possible, or preferably before the shock occurs, and it is here that anticipation is particularly valuable. Regardless of the presence or absence of anemia, there are many patients in whom the general condition is not good, but is as good as we are able to obtain, the so-called poor operative risk. There are many patients whose general condition is good or fair, but on whom we expect to do an operation, difficult for surgeon and patient, in which there will be considerable trauma and loss of blood, as when there are many adhesions, or large fixed tumors or in extensive resections of malignant growths. It is in such conditions that it is well to be prepared and to give a transfusion during the operation. Transfusion is very valuable in maintaining blood volume and in supporting the circulation during severe operations. In the course of such an operation when pulse volume is decreasing and pulse rate is increasing, there is a very striking improvement in volume of pulse, a definite slowing of the pulse rate and a rise in blood pressure after massive blood transfusion. It is of great value to the surgeon to have a transfusion started when he is in the midst of a difficult operation and the anesthetist warns that the patient's pulse is getting weaker, and the surgeon is not in a position to discontinue the operation; or to have the patient leave the operating room, after a severe operation, with as much or more blood than when she arrived. These patients stand large transfusions well, when there has been loss of fluid or blood from the circulation. To replace the fluid volume with saline or glucose solution is very temporary as it soon leaves the circulatory system, but transfused blood if given in due time, remains in circulation and is superior to any other substitute. A patient leaving the operating room with a good circulation and with more blood than when she arrived, is better able to resist or cope with postoperative complications than one who leaves the operating room in a state of exhaustion or shock.

Dr. James S. Taylor, Chairman of the Committee on Maternal Welfare in Pennsylvania, has furnished me with some interesting data on the mortality in ectopic gestation collected in the New York Survey, the Philadelphia Survey, and the Fifteen States Survey. The Committees attribute the lack of appreciation of the necessity for blood transfusion as one of the factors responsible for this mortality.

SERIES DURING OPERATION

One hundred and twenty-one of the transfusions were done during operation. The usual procedure in an elective abdominal operation, when it is thought that a transfusion will be of benefit, is to have the bloods of the patient and the prospective donors typed and cross-matched in advance, and Kahn tests made. The suitable donors report at the

be fresh and healthy. The wounds are then accurately approximated with interrupted sutures. Below the level of the hymen the tissues in the perineum are approximated by two layers of interrupted sutures.

It is most important to close the upper angles of the wounds so that the tissues will not be undermined by the lochia. The sutures should not be drawn tighter

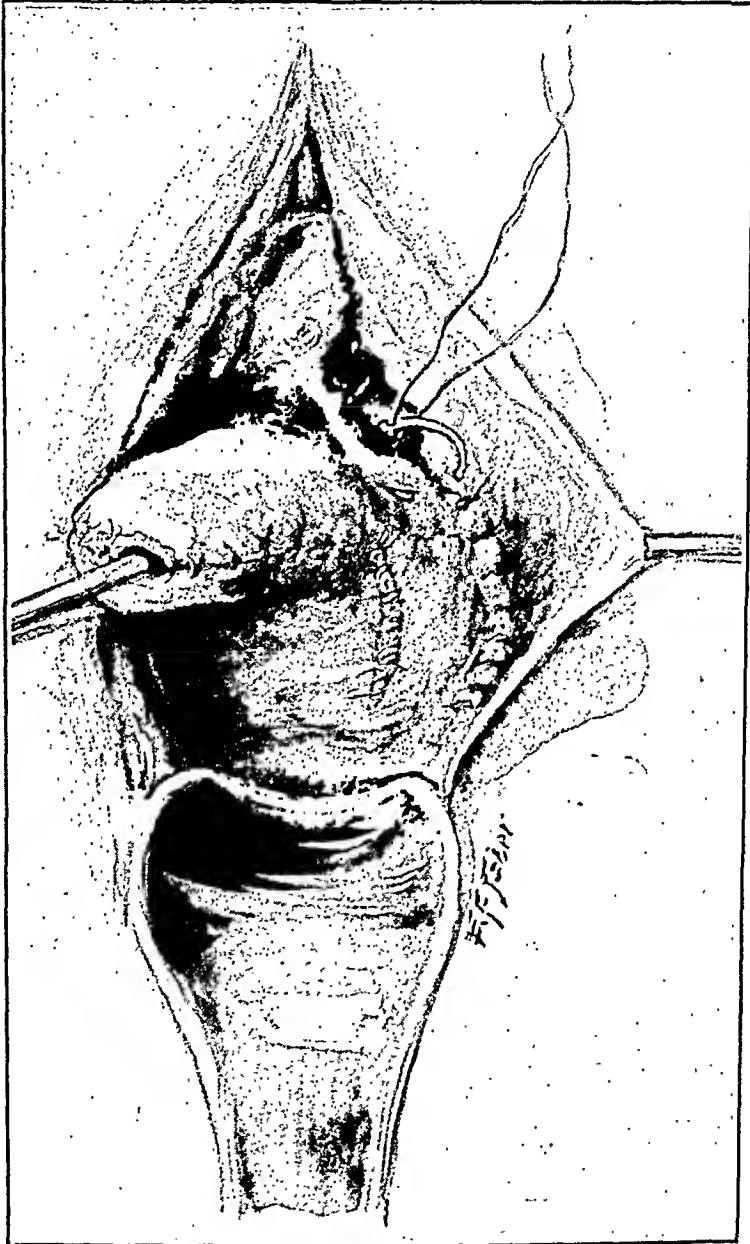


Fig. 5.—Laceration at side of rectum has been repaired; superficial laceration at side of vulva being sutured.

than is sufficient to coapt the tissues. If, in addition, the tight abdominal binder is discarded twenty-four hours after delivery, and the necessary prophylactic measures used, such as the genupectoral position and exercises, including the monkey trot and the mule kick, the incidence of retrodisplacement of the uterus will be decidedly reduced, there will be fewer subsequent operations, and we will have healthier and happier mothers.

for twelve hours beforehand. The transfusions are carried out by one individual (M. H. B.), who personally cares for the apparatus and needles. A minimum of delay in transferring the unmodified blood is very important in avoiding reactions. The occurrence of chill or temperature reaction does not seem to depend on the quantity of blood given. This, of course, would not be true of incompatible bloods. In our series there were very few patients transfused for infection, so because of our limited experience, we do not advocate massive transfusions in this type of case.

There was an average increase of 10 to 15 per cent in the hemoglobin after transfusion of 500 to 600 c.c., and 20 to 30 per cent in transfusion of 1,000 to 1,200 c.c. In a patient with hemoglobin of 30 per cent, for instance, one can usually expect an immediate increase of hemoglobin to 50 or 60 per cent after a transfusion of 1,000 to 1,200 c.c.

Table I indicates some of the more common conditions in which transfusion was used before or during operation.

TABLE I

<i>1. Acute Anemia</i>	
Ruptured ectopic pregnancy	12
Abortion	11
Hydatidiform mole	1
Banti's disease	2
<i>2. Chronic Anemia From Menorrhagia or Metrorrhagia</i>	
Fibroids	45
Pelvic inflammatory disease	24
<i>3. Malignant Disease (Transfused because of anemia or poor general condition)</i>	
Carcinoma of cervix uteri	9
Carcinoma of fundus uteri	4
Carcinoma of ovary	10
Sarcoma of uterus	1
Carcinoma of stomach	7
Carcinoma of colon	5
Carcinoma of liver	1
Carcinoma of pancreas	2
Carcinoma of kidney	1
Hypernephroma of kidney	1
Carcinoma of bladder	1
Carcinoma of breast	4
<i>4. Poor Operative Risks</i>	
Pelvic inflammatory disease	21
Fibroids	7
Biliary tract disease	19
Peptic ulcer	3

Whether transfusion is done in a given patient depends on the degree of anemia, the general condition of the patient, and the nature and extent of the operation.

It is by no means a panacea as is evident from the mortality in this series, but it is one of the safeguards that we can use in a patient who is not well equipped to withstand the contemplated operative procedure.

The greatest benefit derived from intermediate repair is probably the restoration of the cervix uteri to a normal condition. It is well known that the frequency of carcinoma is increasing at the rate of more than 2 per cent a year, that carcinoma of the cervix uteri is developing each year in women of younger age, and that the cervix uteri is a favorable nidus for the development of carcinoma. When an intermediate repair is performed, the cervix is always restored to a healthy condition, and the patient is discharged from the hospital with a normal organ. Statistics apparently show that carcinoma of the cervix uteri seldom develops in a cervix which has been repaired, amputated, or thoroughly cauterized. Intermediate repair is, therefore, the best prophylactic measure at our disposal for carcinoma of the cervix uteri.

CONCLUSIONS

1. Nearly every patient is lacerated in some part of the birth canal during labor.
2. All lacerations wherever located should be repaired before the patient is discharged from the hospital.
3. The most satisfactory time to do the repair work is from five to ten days after delivery, at which time the birth canal can be restored to a normal condition. As a result, the patient will enjoy, as far as the pelvis is concerned, the same good health as before gestation took place.
4. In 744 intermediate repairs there has been no undue morbidity, and no mortality.

REFERENCES

Alcock, Thomas: London Med. & Phys. J. 44: 193, 1820. *Hirst, Barton Cook:* Am. J. Obst. & Dis. Women & Children 75: 752, 1917.

1930 CHESTNUT STREET

DISCUSSION

DR. IRVING W. POTTER, BUFFALO, N. Y.—I agree with Dr. Tracy in the points that he has brought out with regard to intermediate repair. In 1927 I read a paper before this Association on immediate repair and I am inclined to think that the immediate repair is more satisfactory.

The injuries to the birth canal may be divided into two classes; first, those in the lower uterine segment. Those injuries, in my opinion, are not due to the surgeon unless he has manually dilated the cervix and the lower uterine segment, or unless he has applied forceps when the lower uterine segment is not obliterated or dilated, or unless he has attempted version and extraction with an undilated os. The injuries in that locality which we found were the greatest on the side of the occiput. As to the lower birth canal, we have formulated a plan of preparing the patient for delivery. Immediately before delivery her bladder is emptied, no matter whether she has voided or been catheterized on the outside. We do that to prevent detachment of the bladder from its pivotal points of attachment. Then the posterior vaginal wall is protected by a careful ironing out of the vaginal canal until all resistance is overcome. In this way we have been spared the necessity of doing episiotomies and have had less damage to the canal.

No evidence of metastases to glands, liver, or peritoneum was found. X-ray examination of the colon with barium before the second operation, and examination of the specimen removed revealed almost complete occlusion of the lumen of the colon, although the patient had no symptoms of obstruction. Massive blood transfusions in this seriously handicapped patient helped to carry her through two severe operations with an increase of 22 per cent hemoglobin in spite of profuse bleeding in the first operation.

A study of the following case reports will reveal that by careful pre-operative preparation and by transfusions at the time of operation our efforts were toward salvaging what we could rather than denying patients surgical treatment because of the hazards involved.

CASE REPORTS

MORTALITY BEFORE ONE WEEK AFTER OPERATION

CASE 1.—Patient, aged fifty-five years, had Banti's disease, cirrhosis of liver, diabetes, and chronic nephritis. Operation: Splenectomy. Transfusion during operation, 1,200 c.c. Patient had repeated hemorrhages from the stomach before operation, and several transfusions were done for anemia. Following operation there was distention and vomiting, but this was relieved by in-lying nasal tube. Coma developed five days after operation, with death on the sixth day. Impression was that patient died of hepatic and renal insufficiency.

CASE 2.—Patient, aged sixty-four years, had chronic cholecystitis, cholelithiasis, choledocholithiasis with jaundice, chronic myocarditis, intestinal and omental adhesions. Operations: Separation and division of adhesions, cholecystectomy, and choledochostomy. Transfusion, 500 c.c. Patient was a poor operative risk from the standpoint of her circulatory system. She had preoperative preparation with glucose solution. The operation was difficult and the patient's condition was unsatisfactory from the time of operation until death twenty-four hours later. Pulse was weak and irregular throughout.

CASE 3.—Patient, aged sixty years, had carcinoma of ascending colon and intestinal obstruction. Operation: Ileostomy. Transfusion, 1,000 c.c. Patient was stout and anemic. Abdomen was distended and peristaltic waves were visible. She had been vomiting off and on for a month and several days were used to prepare her for operation. The mass in the ascending colon was so adherent that cecum could not be delivered. Small intestines were greatly dilated. Ileostomy was done in lower ileum. After operation, abdomen remained moderately distended and enterostomy did not drain well, and the temperature and pulse remained elevated. There was profuse drainage of dark green fluid from nasal tube in stomach. Patient died six days after operation, apparently from peritonitis. No autopsy was permitted.

CASE 4.—Patient, aged twenty-seven years, had carcinoma of sigmoid with metastases to both ovaries and the peritoneum. Operation: Bilateral oophorectomy and Mikulicz operation (first stage) for tumor in sigmoid. Transfusion during operation, 1,000 c.c. Aside from dragging sensation with pressure of mass in lower abdomen, there were no symptoms of the extensive malignant condition found at operation. The ovaries were the size of grapefruit and were not adherent. Nodules were present on the surface. Nodules were present in the omentum adherent to the growth in the colon. Patient died three days after operation from peritonitis and septicemia. (*Streptococcus hemolyticus* was recovered from heart's blood at autopsy.)

eration, whether immediate or intermediate, is likely to be successful, unless it is dealt with in a different manner than that followed in the ordinary repair of the relaxed or lacerated perineum.

However, when that fixed point is not injured but only the lower part of the vaginal vault is damaged, any of the classical operations for the repair of the perineum or of a cystocele will suffice.

We have no method, so far, of ascertaining immediately following the birth of a child how extensively the fixed point in the pelvis has been injured. Therefore, in simple cases of pelvic injury, immediate repair will be successful, while in the more extensive lacerations it is not likely to be successful.

DR. TRACY (closing).—In many cases, immediately after delivery it is impossible to determine the extent of the damage, and this is one reason why the results from intermediate repair are much superior.

In the spring of 1935, Nugent presented before the Obstetrical Society of Philadelphia a paper entitled "The Primiparous Perineum After Forceps Delivery. A Follow-Up Comparison on Results With and Without Episiotomy." Over 200 patients were followed up and analyzed carefully as to the condition of the perineum. As a result of this observation the statement was made: "There are some patients who deliver without episiotomy and without lacerations, but when they come in six or eight weeks later, they do not have the same perineum. This series emphasized the importance of submucous lacerations and the difficulty of recognizing and correcting them at the time of delivery." Any obstetrician who checks his results a few weeks after delivery will find that a certain percentage of his patients are in a condition similar to that found by Nugent. With intermediate repairs these failures can be avoided.

MUCOCELE OF THE VERMIFORM APPENDIX*

WALTER T. DANNREUTHER, M.D., NEW YORK, N. Y.

(From the Department of Gynecology, New York Post-Graduate Medical School and Hospital, Columbia University)

MUCOID distention of the vermiform appendix is an unusual but not rare pathologic condition, and in the absence of pronounced enlargement is only of academic interest. Virehow²³ recognized and described it in 1863. In many instances, however, the confined accumulation of mucus is responsible for a gigantic tumefaction which leads to an erroneous diagnosis. Even a large mucocele may cause few symptoms until rupture follows the intolerable intrinsic pressure.

In the *Practical Surgery of the Joseph Price Hospital*, Kennedy¹¹ describes and illustrates three specimens of enormous size, which he terms "mucoid-appendix." In the first one, the proximal third of the appendix had been, so to speak, swallowed by the cecum, or there had been an intussusception of the proximal one-third of the appendix into the colon. Each of the other two specimens was of mammoth proportions, one measuring eight inches in length and eight inches in circumference. Both patients had had discomfort in the right lower abdominal quadrant for many years before developing acute symptoms, and the appendix was found ruptured at laparotomy in both instances. One specimen extended up toward the kidney and

*Read at the Forty-Eighth Annual Meeting of the American Association of Obstetricians, Gynecologists, and Abdominal Surgeons, Skytop, Pa., September 16 to 18, 1935.

CASE 10.—Patient, aged fifty-five years, had a carcinoma of head of pancreas. Operation: Cholecystogastrostomy. Transfusion during operation, 500 c.c. Patient had complete biliary obstruction for ten weeks before admission. Marked purpura was scattered over the body, and melena were present. Coagulation time ten minutes. Bleeding occurred intermittently all day from puncture wound to determine bleeding time. Patient was given calcium, glucose, and 500 c.c. of whole blood daily for three days before operation. This reduced coagulation time to two and one-half minutes and bleeding time to three minutes. Operation was done entirely with local anesthesia, and patient left operating room in good condition. Following operation, temperature rose steadily to 107° before death thirty-six hours later. There was also increasing mental dullness which went on to stupor and coma. Incision was reopened after death and no evidence of hemorrhage or peritonitis was found. Death was attributed to liver insufficiency. Carcinoma of head of pancreas and suppurative cholangitis were found to be present on microscopic examination.

MORTALITY LATER THAN ONE WEEK AFTER OPERATION

CASE 1.—Patient, aged sixty years, had chronic cholecystitis, cholelithiasis, carcinoma of head of pancreas, and jaundice. Operation: Cholecystostomy (removal of stones), choledochostomy, and biopsy. Transfusion during operation, 500 c.c. Jaundice for five weeks before operation. Preoperative preparation with glucose. Patient died eight days after operation. Pathologic diagnosis: Adenocarcinoma of pancreas.

CASE 2.—Patient, aged seventy years, had carcinoma of pylorus. Operation: Subtotal gastrectomy and gastrojejunostomy (Polya). Transfusion, 500 c.c. Patient had normal temperature and pulse for ten days before her sudden death while sitting up in bed talking to friends thirteen days after operation.

CASE 3.—Patient, aged sixty-nine years, had duodenal obstruction and cicatrizing duodenal ulcer. Operation: Gastroenterostomy. Transfusion, 500 c.c. Patient had been vomiting everything for three weeks before operation. X-ray examination revealed retention of 90 per cent of barium in stomach at six hours. Patient died of pneumonia thirteen days after operation.

CASE 4.—Patient, aged fifty-four years, had carcinoma of ascending colon. Operation: Resection of terminal ileum, ascending colon and a portion of transverse colon, and ileocolostomy (Mikulicz). Transfusion, 600 c.c. Patient had always been very thin and had lost weight before operation. Death occurred sixteen days after operation from malnutrition and infection of wound around intestinal fistula.

CASE 5.—Patient, aged fifty years, had a general carcinomatosis of abdomen. Operation: Exploratory laparotomy. Transfusion, 1,000 c.c. Patient had radical operation for carcinoma of breast twenty months beforehand. She was admitted with vomiting and ascites. At operation, general carcinomatosis was found. Patient continued to vomit and died seventeen days after operation.

CASE 6.—Patient, aged forty-two years, had a sarcoma of the uterus. Operation: Laparotomy, dilatation of cervix and insertion of radium. Transfusion during operation, 600 c.c. Patient had menorrhagia and metrorrhagia for four months before admission. She was running a septic temperature on admission. History of having passed a fleshy mass two weeks beforehand. There was a hard, irregular, movable mass filling the pelvis to above the umbilicus. Hemoglobin, 32 per cent. Aschheim-Zondek test was negative. One month after admission patient extruded a large, sloughing, pedunculated mass from the uterus. This was removed and pathologic diagnosis was leiomyosarcoma. Blood transfusion of 500 c.c. was

CASE REPORT

Mrs. F. Z., aged forty-nine years, presented herself on May 22, 1933. Most of the details of the family and previous personal history were irrelevant. She had menstruated at the age of fourteen, married at twenty-one, had borne 5 children, had one spontaneous abortion, and entered the menopause at forty-five years. She then developed a climacteric psychosis which cleared up after a few months. Eight weeks before coming under observation she lifted a heavy weight. This overexertion was immediately followed by pain in the lower abdomen and moderate vaginal bleeding. The hemorrhage stopped after four days, but the pelvic discomfort persisted. There were no other symptoms.

There were no significant findings in the general physical examination, and various laboratory tests revealed nothing abnormal. The vaginal walls were somewhat relaxed. The cervix was small, with a perfect epithelial covering despite a moderate laceration, showed the usual postmenopausal changes, and was located high up in the posterior vaginal fornix. The uterine corpus was found to be dislocated backward and to the left. An irregular "lumpy" mass, about the size of an orange, occupied the usual site of the uterus and practically filled the pelvis. It moved slightly with the cervix on manipulation and was apparently intrinsic in



Fig. 2.—Mammoth mucocoele of the appendix, almost filling the pelvis. Most of the adhesions have been omitted in the illustration, so that the anatomical relationships can be clearly seen.

or attached to the corpus, although its mobility was greatly limited. The mass was identified as either a group of small myomatous tumors originating in the right uterine wall, or a densely adherent adnexal enlargement. Normal adnexa were not palpable on either side, and in view of the negative previous history the factor responsible for the restricted mobility seemed mysterious. Since there had been no recurrence of bleeding subsequent to the overexertion, and none before it, a panhysterectomy without preliminary curettage seemed warranted.

Operation.—June 20, 1933. On opening the peritoneal cavity, a thick, non-adherent omentum was found extending down to the pelvis, which was roofed over by dense adhesions. The exploring hand, insinuated into the pelvis, discovered an irregularly distorted mass which was generally adherent. It was angulated on itself in two or three places, much like a hydrosalpinx, and felt quite hard, although it was evident that its contents were semifluid. This mass occupied practically the position of the uterus. The uterus and adnexa, however, lay deep in the pelvis behind the mass (Fig. 2) and were miniature in size. The lower margin of the cecum and ileocecal junction were closely adherent to the pathologic mass, necessitating release by sharp dissection. Mobilization of the tumefaction as a whole

REFERENCES

- (1) *Blaloch, Alfred*: Arch. Surg. 29: 837, 1934. (2) *Bronfenbrenner et al.*: J. A. M. A. 99: 1194, 1932. (3) *Brines, O. A.*: J. A. M. A. 94: 1114, 1930.

DISCUSSION

DR. DAVID N. BARROWS, NEW YORK, N. Y.—On the gynecologic service of Bellevue Hospital from January, 1931, to September, 1935, a total of 412 patients received 716 transfusions. There were no deaths in any way attributable to the transfusions. Three patients had severe reactions, two with anuria for twelve hours, then jaundice and hematuria; the third with oliguria and jaundice. Two hundred and five patients were transfused for hemorrhage, sudden or prolonged, such as with abortions, ectopic pregnancy, or fibroids; 176 patients were transfused for septic and inflammatory conditions; 30 patients for anemia associated with malignant growths, mainly carcinoma of the uterus.

The 205 patients transfused for loss of blood received 263 transfusions. The large majority, 152, received 500 c.c., while 17 received 600 c.c. or over. When the first transfusion proved insufficient, it was repeated once in 39 cases, twice in 10, and 4 times in 2 cases. In these hemorrhage cases there were 13 slight reactions with temperature up to 101.6°, 8 moderately severe with temperature up to 103°, and 1 quite severe with temperature to 105°, but no other alarming symptoms. Eight of these patients died; none, however, from transfusion.

In the septic group, 176 patients received 414 transfusions, the average being, therefore, 2.4 each. Fifteen patients received 5 transfusions; two, 7 transfusions; one, 9 transfusions; and one, 13 transfusions.

With repeated transfusions we use as a rule 250 to 500 c.c. at a time. Of this group 9 had mild reactions, and 2 severe with anuria, hematuria, and jaundice. Forty-six patients died, but none from transfusion.

There were 30 cases of malignancy and disease, receiving 39 transfusions, with 3 moderate and 1 fairly severe reaction.

Take a patient whose blood value is already low, deplete it further by hemorrhage or operative loss, and a few hours of the resulting anemia before transfusion is performed can produce tissue cell changes from which the patient will not recover. This fact explains the reason why patients with placenta previa, ectopic gestation, etc., will die following a comparatively slight blood loss during treatment after withstanding a number of quite severe hemorrhages. This has been well worked out by Roome, Keith and Phemister and must be kept in mind when planning any operative procedure on an anemic subject.

As to the dangers of transfusion, of which few of us think at the time of need, Brines' report of only two to four fatalities in 4,000 attributable to the transfusion alone, is encouraging. David Bull says that the use of whole blood as compared with citrated blood has reduced the reactions of moderate degree from 5 or 3 to 1.

Mention is made of donors by Cashman, fasting twelve hours, presumably to avoid allergic reaction due to diet of donor, which is a good point. Cross-matching may not be necessary in well-grouped cases, but it eliminates the chance of error in a busy clinic.

Availability of donors is a sore point with us at Bellevue. The average size of our transfusions for hemorrhage has unquestionably been reduced by the unwillingness of city paid donors to give more than as little blood as possible, and never over 600 c.c. Typing the medical students, as done at the University of Pittsburgh, makes a large group available and seems an improvement over routinely typing all postoperative and other suitable cases in the ward and using them in an emergency as reported by Wangenstein. Many clinics routinely employ 800 to 1,000

Pathologic Report.—Specimen measured 75 by 55 by 30 mm. (it had collapsed to a considerable degree as a result of rupture during operation). It presented an irregular, lobulated surface, formed by a thin, fibrous wall; on the outer side it was rough, gray, and hemorrhagic. There were openings through which coagulated mucus exuded. On section, it was a thin-walled, dilated sac, apparently representing the appendix (Fig. 3). The wall was densely fibrous and measured 2 to 3 mm. in thickness. The cavity was filled with coagulated mucus and partly discolored by blood. The inner wall was crossed by fibrous striae, and mucus and blood clung to it at many points. There was also about 100 c.c. of coagulated mucus which had been expressed from the appendix.

Sections through the wall at its thickest point showed one area in which the mucosa of the appendix could be recognized with its typical glands and interglandular stroma, the latter diffusely infiltrated with mononuclear cells containing old blood pigment. At other points the wall was composed of hyaline fibrous tissue in which a few muscle bundles could be recognized, and in which there were foci of lymphocytes as well as diffuse infiltration of leucocytes and mononuclear cells (Fig. 4). The latter, however, were more dense about the blood vessels. From the inner surface of the fibrous tissue wall, delicate strands of fibrous tissue extended inward and were lost in the more abundant mucous exudate. The few cells seen within the mucus or about its margin could not be recognized as epithelial cells. They were chiefly of fusiform or stellate shape; hence, the origin of the mucus was not evident. It could be due to extensive degeneration of epithelium, or it could be purely inflammatory in character.

COMMENT

The diagnostic error was due to the miniature uterus and adnexa having been displaced backward in the pelvis and covered completely by the appendiceal mass, which occupied the usual site of the uterus. The impulse of the cervical manipulation transmitted throughout the mass apparently demonstrated that the two structures were directly united. The impression of multiple small fibroids was undoubtedly due to variations in thickness and resistance in different areas of the thinned appendiceal coats. The exact size of the mucocoele could not be measured, because so much mucus escaped when it was ruptured during the operation, and because of the consequent partial collapse.

ETIOLOGY AND PATHOLOGY

The terms mucocoele of the appendix, mucoid appendix, residual appendicitis, retention cyst of the appendix, and hydrops of the appendix, have been used by different pathologists to designate various stages of the same pathologic process, but are not truly synonymous. There are three physical factors involved in all of these lesions: first, a slowly stenosing process with final complete obstruction at some point along the appendiceal lumen; second, retention and accumulation of the secretory products of a sterile mucous lining; and third, gradually increasing distention of the viscus, distal to the obstructed area. The condition is initiated by an occlusion of the lumen, usually close to the cecum by a mechanical, inflammatory, or carcinoid process. The stenosis occurs just beyond the cecum in most instances, so that the entire length of the

FIBROSIS OF THE PLACENTA*

ITS SIGNIFICANCE IN THE NORMAL AND IN THE SYPHILITIC ORGAN

THADDEUS L. MONTGOMERY, M.D., PHILADELPHIA, PA.

(From the Department of Obstetrics, Jefferson Medical College Hospital)

THREE circumstances have led me to undertake a study of fibrosis of the human placenta: first, a paper on the subject "Fetal Death in Pregnancy"¹⁴ presented by J. Stuart Lawrence before the Philadelphia Obstetrical Society in October, 1932; second, the looseness with which the term "fibrosis" is applied to the gross appearance of certain indurated lesions of the placenta; and third, the questionable authenticity of descriptions of the syphilitic placenta which appear in textbooks of obstetrics.

As to the first of these, I was keenly interested in Dr. Lawrence's observations. He had followed closely the character and rapidity of the fetal heart rate in a group of prenatal patients with the purpose of detecting the first signs of inanition of the fetus and forestalling the occurrence of intrauterine fetal death. Increase in rapidity of the heart rate and unusual activity of the fetus were taken as evidences of fetal embarrassment, and the intravenous injection of concentrated solutions of dextrose into the mother was the method used in the relief. Dr. Lawrence attributed the symptoms of inanition of the fetus to disturbances in the permeability of the placenta and stated that in the majority of the cases fibrosis of the placenta was found upon histologic study of the secundines after delivery.

In the discussion of his paper I stated that while it is possible for large portions of the placenta to be thrown out of function by necrosis of villi and by intervillous thrombosis and thus cause fetal death, I had never seen fibrosis of the placenta of a grade sufficient in my opinion to produce this outcome. I went on to say that while I, too, had been guilty of using the term rather freely, I was beginning to doubt the existence of fibrosis of the placenta as a pathologic entity, and though at the time I had insufficient data at hand to support this opinion, I was resolved to go into the subject more thoroughly at some future date.

With this thought in mind I have reviewed my placental sections, studied the histories of the corresponding patients, and endeavored to determine: first, what effect the so-called lesion of fibrosis has upon

*Read at the Forty-Eighth Annual Meeting of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons held at Skytop, Pa., September 16 to 18, 1935.

SYMPTOMATOLOGY

Middle-aged and elderly women, rather than other individuals, seem to be predisposed to mucocoele of the appendix. A quiescent mucocoele, per se, is apparently characterized by a paucity of symptoms, except for localized discomfort or a dull pain referred to the site of the distended appendix, although some patients complain of nausea or other vague manifestations of digestive disturbance. When irritated, traumatized, or ruptured, or when adjacent structures are compromised by the impingement of the tumefaction, the patient may manifest a gastrointestinal syndrome which may simulate disease of the stomach, gall-bladder, or appendix. If the mucocoele becomes invaginated into the cecum, the symptoms will be those of intussusception and obstruction. Davison³ reports a case in which the acute symptoms were nausea and hematemesis after three years of epigastric discomfort and progressive physical weakness. Diarrhea or blood in the stools occurs occasionally. As a rule, however, most patients tolerate the annoyance for several years before the prolonged discomfort becomes so distressing, or the pain is so intensified, that relief is sought.

DIAGNOSIS

A correct preoperative diagnosis is extremely difficult, because the tumor may be so situated that it cannot be palpated. On the other hand, if it is felt, its consistency, fixation, malposition, and large size may be entirely misleading. A large mucocoele may be mistaken for an intraperitoneal neoplasm, especially a new growth of the cecum or an adnexal or uterine tumor. The simulation of a particular lesion is largely contingent upon the location of the mucocoele and its attachment to surrounding structures. Gastrointestinal roentgenography is usually useless as a diagnostic aid, since the contrast medium cannot pass the point of obstruction and enter the overdistended viscus, although Vorhaus,²⁴ Simon,¹⁹ LeWald,¹² and Lifvendahl and Ries¹³ each report instances of positive roentgenographic observations. This would seem to prove that a mucocoele can form without complete occlusion, or at least with intermittent patency, of the proximal end of the appendix. Even after the abdomen is open, the operator must be on guard lest he mistake the enormous enlargement of the appendix for some other pathologic condition.

TREATMENT

The treatment of mucocoele of the appendix is surgical. The mass should be mobilized so far as possible by sharp dissection and every effort should be made to avoid accidental rupture. When the tumefaction is densely adherent to all the adjacent structures, as it often is, the base of the appendix should be avoided until the rest of its surface

texture of the villi appears different within various portions of the same organ, depending upon the site from which the sections are cut. Particularly as the periphery of the placenta is approached, the walls of the fetal vessels appear thickened, their lumen obliterated in many places, the villous stroma filled with more dense connective tissue, and the caliber of the capillaries reduced (Fig. 12).

There is another phenomenon I have noted, which Runge and Hartman¹² mention in a recent publication; that is, that when the vascular tree of the placenta is collapsed and the lumen of the vessels and capillaries is devoid of blood, the amount of fibrous tissue in the vessel wall and the villous stroma appears grossly exaggerated (Fig. 10). The latter condition is particularly likely to hold when the cord has not been ligated until the pulsation of the funic vessels has ceased, and the placental reservoir of blood has been taken into the fetal circulation, or when the cord has been cut and the blood allowed to drain from the placenta before it is delivered. Surprising differences in the microscopic appearance of the placenta depend upon these several methods of management.

Another factor which influences tremendously the appearance of density of the villous stroma is the degree of maturity of the placenta. The stroma of the placental villus is more richly endowed with connective tissue elements at the twenty-fourth week of pregnancy (Fig. 4) than at complete term (Fig. 9), a phase of the subject I wish to deal with more extensively in connection with the syphilitic patient. Therefore, a placenta slightly immature may lead the uninitiated to believe he is dealing with a beginning fibrosis.

Possibly the greatest error is that committed upon gross examination, of calling gray indurated zones of the placenta "fibrotic lesions." Upon microscopic examination of these "fibrotic lesions" one of two conditions is inevitably found: either a mass of necrotic villi matted together by fibrin deposit, or an old hematoma in which the red blood cells have undergone autolysis. I have dealt with both of these lesions in another paper.⁸ In neither of them is fibrous tissue organization present; in fact in none of them have I ever seen a process of organization beginning. There is only one indurated gross lesion of the placenta in which excess of fibrous tissue is found; that one is a neoplasm and decidedly rare, fibroangioma.

One cannot leave the subject of fibrosis of the placenta without considering its relationship to syphilis. In so doing we undertake a controversial topic. For many years we have been taught that the placenta of the syphilitic fetus has certain unmistakable characteristics, that it is a large organ in ratio to the size of the child, that it has a pale greasy surface, that when teased out under salt solution the villi appear club-shaped and blunt, that the microscopic examina-

DISCUSSION

DR. CHARLES GORDON HEYD, NEW YORK CITY.—In the symptomatology and pathology there is a distinct difference between the reaction set up in the peritoneum by a cystoma of the ovary and that from a mucocoele of the vermiform appendix. For the condition to arise sequential to pathologic changes in the appendix, a certain mechanism is essential. There is always occlusion of the proximal portion of the appendix, with a more or less complete destruction of the mucous membrane. In the early stages the condition is not dissimilar to a hydrops of the appendix.

The appendiceal type, however, does not produce the cystic changes which are comparable to a similar condition arising in an ovarian cyst. The pathogenesis of the appendiceal type may be considered to a large extent degenerative; whereas in the ovarian type, with or without rupture, the behavior is as a rule that of a neoplastic condition. In the latter, cellular proliferation is set up at remote distances from the original site, and metastases may occur in the abdominal wall, in any portion of the abdominal cavity, and in the lungs and subcutaneously, as in a recent case reported by Hancock. ("Pseudomyxoma Peritonei," *Am. J. Surg.* 28: No. 3, 1935.)

The peritoneal changes are the result of two factors: (1) the reaction of the peritoneum, and (2) cell autogenesis. The reaction of the peritoneum is the well-known one of the exudation of mucinous material as the result of irritation of the serous membrane. The material is characterized by an intensely adhesive property, and spreads treelike in the intestinal interstices, producing marked intestinal agglutination. It is essential that the surgeon be guarded in his prognosis, for, while some patients recover after the extirpation of the primary disease, in the majority of cases this does not obtain, particularly in those that arise from ovarian cystoma.

DR. JAMES W. KENNEDY, PHILADELPHIA, PA.—The three cases of mine, which Dr. Dannreuther has referred to, were so confusing in their pathologic extensions and intimate adherent relation to surrounding structures, that I was unable to diagnose a mucocoele of the appendix until late in the enucleation and dissection of these gigantic appendices from their surrounding structures. I felt I was dealing with a colloid malignancy of the ascending colon.

In these three cases the appendix was ruptured in two and a good quantity of pseudomucin was free in the abdominal cavity. It was evident that the rupture of the appendix brought the patient to the hospital. In each case there was a history of many years' right-sided symptoms, yet there was no severe pain until the rupture of the appendix.

The fatal outcome of this condition is due to rupture of the mucocoele and the production of pseudomyxomatous peritonitis, an analogous condition to the papillary cystadenoma of the ovary, and is a reactionary peritonitis of progressive character. As long as the mucocoele of the appendix remains unruptured, the condition is benign; when ruptured, it becomes clinically malignant.

The pathology of the mucocoele of the appendix rather indicates its etiology; the great size of the organ, its occlusion at the approximal extremity, and its contents of pseudomucin pointing to a mild irritation long continued with the result of a large distended organ from an exudative process of the mucous membrane. The mucous membrane itself is atrophied and in many locations there is little evidence of epithelium, which is probably due to pressure from distention. The wall of the appendix is pearly white and fibrous, showing muscular atrophy.

It is a condition appearing late in life. My experience as to sex differs from Dr. Dannreuther, as 7 of his 8 cases reported were females, whereas 6 of the 7 cases which I have had occurred in males. I believe one-tenth of 1 per cent is a fair incidence of the mucocoele of the appendix.

From my examination of specimens of syphilitic placentas, I find three conditions which are frequently present: first, a preservation of



Fig. 1.—Placental villi at the fourth week of pregnancy. Note the free growth of chorionic epithellum, the jellylike stroma of the villi, and the infrequency of cellular elements in the latter. ($\times 100$)



Fig. 2.—The placental villi of spontaneous miscarriage. (Nonsyphilitic patient.) Langhans' cells and syncytium well preserved; more cellular elements in mesoblastic stroma; capillary formation still limited. ($\times 150$)

the syncytial covering of the villi with unusual absence of the necrosis or intervillous fibrin deposit which characterizes the average

WHEAT GERM OIL (VITAMIN E) THERAPY IN OBSTETRICS*

E. MACBETH WATSON, M.D., M.Sc.(WEST. ONT.), F.R.C.P.(EDIN. AND CAN.), AND W. PELTON TEW, M.B.(TOR.), F.R.C.S.(EDIN. AND CAN.), M.C.O.G., LONDON, CANADA

(From the University of Western Ontario Medical School)

INTRODUCTION

EVANS and Bishop¹ in 1922 reported that rats which were maintained upon supposedly complete dietaries could not reproduce unless certain food substances were included in their rations. The animals, apart from the infertility, appeared to be normal. The females exhibited natural estrus cycles and would breed and conceive, but they failed to deliver their young on account of some disturbance which caused the intrauterine death and the subsequent resorption of the fetuses. It was observed, however, that the inclusion of whole wheat cereal, fresh lettuce leaves, or dried alfalfa in the diets of the pregnant animals permitted reproduction to occur in a normal manner. While it was evident that the sterility of these rodents was due to the absence of some essential element from their food, the condition could not be related to any of the hitherto known vitamins. Consequently Evans and Bishop¹ designated the unknown substance necessary for reproduction as the accessory food factor X. Sure² independently and at about the same time arrived at the same conclusions as did Evans and his coworkers, namely, that sterility could be produced in laboratory animals by certain test diets and prevented by the addition of foods which contained, presumably, the substance X. Sure² proposed that the newly discovered antisterility factor be named vitamin E, a term which has been universally adopted. The existence of this vitamin has been adequately confirmed by the work of numerous investigators subsequently.

It was only natural that an attempt should be made to adapt these new discoveries to human conditions. While the direct correlation of effects observed in laboratory animals with human problems may imply unwarrantable analogies, the history of the development of many accepted therapeutic measures justifies the approbation of the experimental method of approach to questions pertaining to the clinical applicability of scientific achievements. Thus the previous investigations concerning the relationship between diet and fertility in small

*Read at the Forty-Eighth Annual Meeting of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons, at Skytop, Pa., September 16 to 18, 1935.

full-term placenta; second, an increased cellularity of the villous stroma; and, third, edema of the villous stroma (Fig. 5). The two latter conditions, particularly the edema, combine to make the club-shaped blunt villi which are so frequently described, add weight to the placenta out of all proportion to the fetus, and confer upon the organ its pale "greasy" appearance. Inasmuch as syphilis is one of the most frequent causes of premature stillbirth, this architectural structure of the placenta has come to be associated with the picture of syphilitic stillbirth. The same appearance, however, may be associated with other causes of stillbirth, particularly where the death of tissue was primary in the fetus.

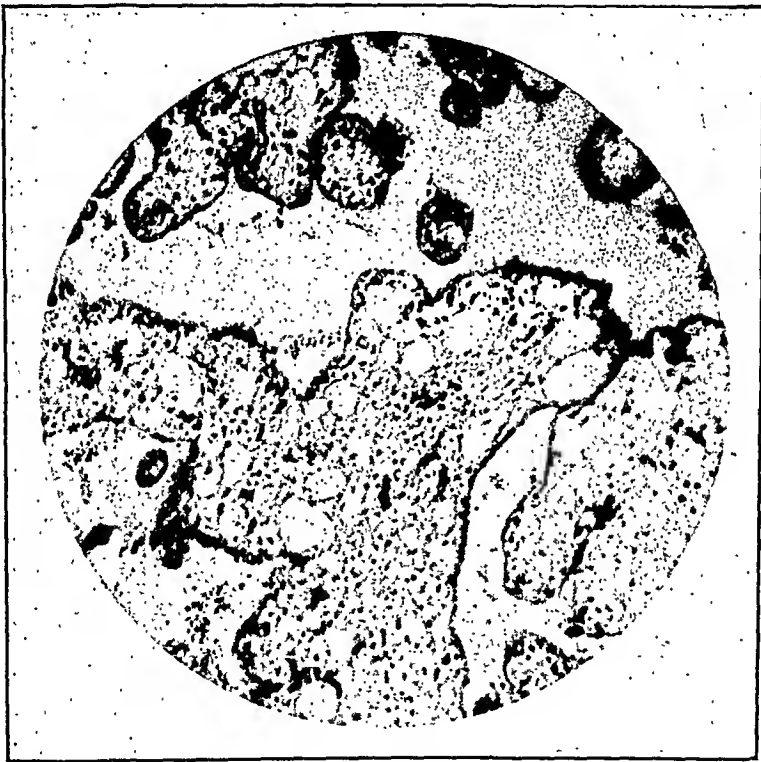


Fig. 5.—Placenta of miscarriage at twenty-six weeks. (Patient aged thirty-nine years; gravida viii; 7 previous macerated stillbirths ranging from the sixth to the eighth month of pregnancy; Wassermann and Kahn negative.) Note the edema of the villous stroma. Practically the same histologic picture as Fig. 4 except for the dilated tissue spaces. ($\times 150$)

I am of the opinion that those histologic changes which we have attributed to syphilis are due to nothing more than the immaturity of the placenta and the accumulation of edema. To substantiate this view, I have studied histologic sections from placentas of syphilitic patients in whom stillbirth occurred at various periods of pregnancy and compared them with the histologic appearance of the placenta, in which arrest of pregnancy has occurred at corresponding periods and due to other causes. One finds great similarity between the appearance of these parallel examples (Figs. 1 to 11).

the onset of the symptoms of threatened abortion, and its administration was a part of the treatment for that condition. Those in Group IV were not pregnant at the time that the oil was used although several of these patients had been pregnant previously. The object of the treatment was to facilitate impregnation.

It should be explained that the word "abortion" as employed in this paper denotes the spontaneous premature cessation of pregnancy at any stage in its course, excluding the delivery of a viable fetus.

All the patients who received the treatment were desirous of offspring and none presented any recognizable gynecologic or other conditions which might have accounted for their reproductive failures. In the majority of the abortion and sterility cases, no therapeutic measures, except the use of wheat germ oil, were employed. But the patients with signs of threatened abortion were subjected to the usual management for that condition plus wheat germ oil.

At first the wheat germ oil was prescribed in the free liquid state, but latterly it has been supplied in a more acceptable form within soluble gelatin capsules, each of which contains 1 c.c. of the oil. For patients with a history of habitual abortions, it was suggested that the usual dosage of from 3 to 6 c.c. per day by mouth be instituted as soon as possible after the commencement of pregnancy and that its administration be persisted until well beyond the time when the abortions usually had occurred. In many instances the use of the remedy was continued until the time of labor. Patients with signs of threatened abortion received larger doses; as much as 20 c.c. of wheat germ oil has been administered in a day without ill effects.

THE OBSERVATIONS

The wheat germ oil was prescribed, as noted above, to a number of patients respecting whom spontaneous abortions, threatened abortions or involuntary sterility constituted the principal abnormalities. The present report deals with the results observed in a series of 80 women who received the treatment.

Habitual Abortion.—Of a group of 18 women who had sustained from three to 15 spontaneous abortions prior to the exhibition of wheat germ oil, 13 went to term or nearly so following the use of the oil and were delivered of healthy, living children. Ten of the patients under this regime completed a pregnancy for the first time. In one instance, a condition of accidental hemorrhage resulted in abortion and in another, the pregnancy in its early stage terminated spontaneously for no known reason twenty-five days after the commencement of the wheat germ oil therapy. One patient was a diabetic subject, but it is doubtful if the diabetes, which is said to have been well controlled at the time, was responsible for her failure to proceed with the pregnancy.

Of the 17 wheat-germ-oil-treated patients each of whom had had two spontaneous abortions, 12 gave birth to healthy, living children following the treatment. In five of the cases, however, the pregnancies were interrupted by spontaneously oc-

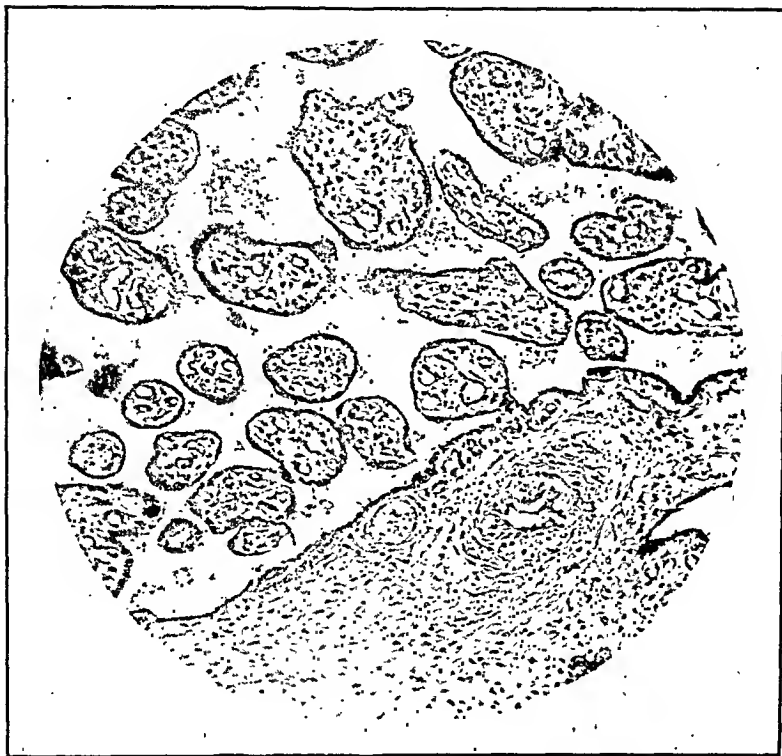


Fig. 8.—Placental villi of stillborn premature baby at thirty-six weeks. (Patient aged twenty-three years; gravida iii; 1 stillbirth, 1 cong. syphilitic baby; Wassermann and Kahn plus 4.) The villi are larger than at full term, syncytium well preserved, stroma rather cellular, capillaries small.

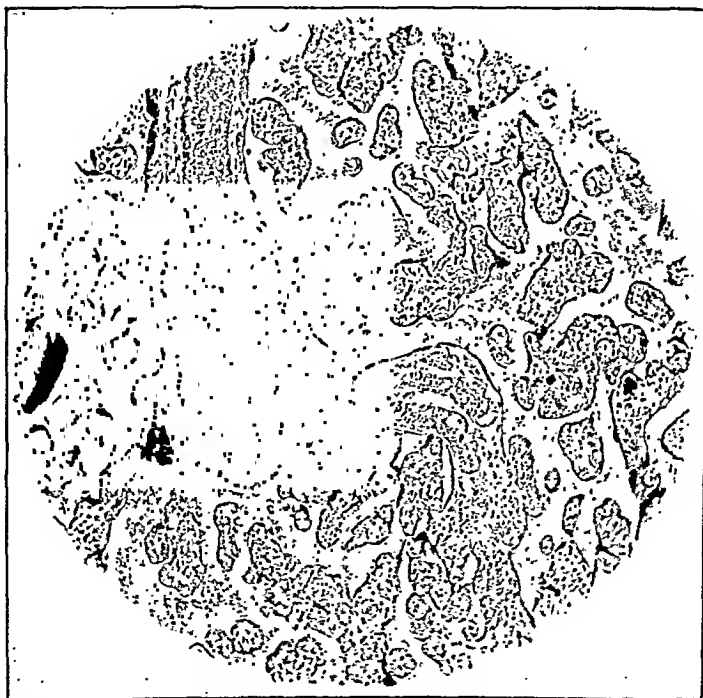


Fig. 9.—Full-term normal placenta with distention of the vascular tree. ($\times 150$)

All of the cases of nonfertility in Group IV of the present series of cases remained barren after using wheat germ oil.

DISCUSSION

No claim is advanced that wheat germ oil is a panacea for abortions in women but circumstantial evidence points to its usefulness in a proportion of such cases, although a logical cause-and-effect relationship is difficult to establish. In the absence of decisive information concerning the factors which contribute to the normal progression of the pregnant state and the consequent lack of knowledge regarding the causation of habitual abortion, an attitude of conservatism is appropriate. Therefore, all apparent results of corrective measures must be interpreted with caution and deliberation.

Although most of the cases of threatened abortion in which vitamin E therapy was used after bleeding had begun failed to abort, it is questionable if the wheat germ oil was entirely responsible for the continuance of the pregnancies since the usual treatment for the condition was employed as well as the administration of the oil. Some allowance may rightly be made for the patients in whom the vitamin E was not administered until the manifestations of abortion were well established and the outcome therefore was inevitable. A few apparent failures are explainable, probably, by the assumption that the fetus was dead before the treatment was commenced. On the other hand, it is a recognized fact that in many cases of threatened abortion the symptoms disappear spontaneously and the pregnancy subsequently progresses to a natural termination regardless of any special form of treatment.

While considering the results observed following wheat germ oil therapy, it is of some significance perhaps to mention that during the course of the investigation here reported, wheat germ oil from three different sources of supply was used and that there is some foundation for the belief that the material from one particular source was inferior as regards its vitamin E potency as compared with that emanating from the other two sources. Thus may be explained some of the apparent failures which have been noted.

SUMMARY

The observations concerning the clinical use of wheat germ oil (vitamin E) in 80 women with various reproductive difficulties, as recorded in this paper, permit the following inferences:

1. Wheat germ oil (vitamin E) appears to be of definite value and to have its greatest scope of usefulness in the prevention of repeated spontaneous abortions (habitual abortion) for which no cause is obvious.
2. The oil may be used with advantage, also, as an adjunct in the treatment of threatened abortion if it is administered promptly and in relatively large quantities.
3. It is of no avail in the treatment of nonfertility.

If one reviews briefly the embryologic development of the placenta, he will be impressed by the influence which the maturity of the organ has upon its microscopic appearance. At three weeks of pregnancy, we find that the villi are large and irregular in shape, the chorionic epithelium consisting of a basal layer of Langhans' cells and a superficial layer of syncytium. The mesoblastic core of the villi consists of a myxomatous tissue in which cellular elements are few and capillaries are lacking (Fig. 1). At the twelfth week of pregnancy the villi are somewhat smaller and more symmetric in contour, Langhans' layer is still fairly well preserved, the syncytial layer is still present, and the mesoblastic core contains a liberal distribution of cells whose oval nuclei are vesicular in character, the latter constituting the un-

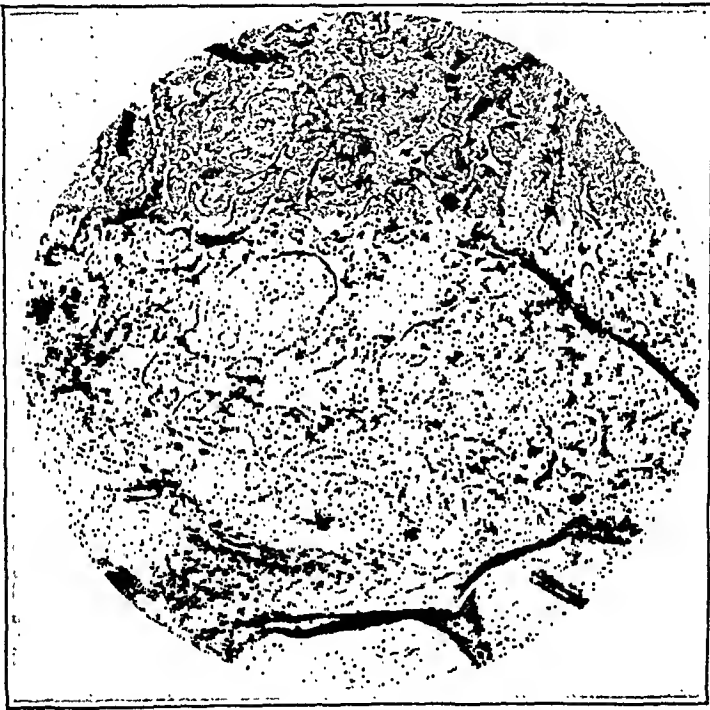


Fig. 12.—Placental vessels and villi and the margin of the placenta. Note the regressive changes in the arterial walls with almost complete obliteration of the lumen. ($\times 125$)

differentiated primary cells of the mesoblast (Fig. 2). At this stage a few small capillaries may be observed. At twenty-four weeks of pregnancy Langhans' layer has disappeared, the syncytium is still well preserved, and the villi are somewhat smaller in size (Fig. 4) though quite coarse in comparison with the full-term villus (Fig. 9). At twenty-four weeks the villous stroma is richly endowed with mesoblastic elements, and the appearance of the section would lead one to believe that a process of organization of the villus was inaugurated. Now if one adds to this appearance of the villus at six months, edema of the tissue spaces due to a failing circulation on the part of a syphilitic fetus, he has a perfect picture of the average syphilitic placenta and of the appearance which holds in each instance of interruption of

DR. TEW (closing).—We do not claim that this therapy is a panacea for abortions, but we do feel that it will assist us in a certain group of the so-called habitual abortions. We tried out several companies and finally settled upon the Canada Pharmacal Company which supplied us with a fairly constant wheat germ. Taken in a tablespoon it had a very nasty taste, but we now have it made in capsule form.

What part vitamin A plays in abortion and its prevention I do not know. Vitamin E apparently offers us no assistance in so-called primary sterility. We had no help in any way in such cases.

CARCINOMA OF THE RETAINED CERVIX OR SUBTOTAL VS. TOTAL HYSTERECTOMY*

JOE VINCENT MEIGS, A.B., M.D., F.A.C.S., BOSTON, MASS.

(From the Surgical Services of the Massachusetts General Hospital)

THE purpose of this paper is to discuss the incidence and nature of cancer appearing in the retained cervix following supravaginal hysterectomy and to add a few interesting facts to the arguments of the advocates of total or of subtotal hysterectomy. The study itself revealed an amazing lack of understanding of the meaning of total or panhysterectomy, and of subtotal or supravaginal hysterectomy. Total or panhysterectomy should mean removal of the entire uterus, the fundus, body, and cervix. To remove the fundus and body and both tubes and ovaries and leave the cervix is not to do a total or panhysterectomy. These facts are not universally known or remembered and for that reason a questionnaire asking specifically whether the cervix was removed or not in a given hysterectomy was necessary before any accurate figures could be obtained. When this fact was established there was a great reduction in the total number of cases discovered.

MATERIAL

The material consists of 80 cases listed as carcinoma of the cervical stump or retained cervix obtained from the records of the Massachusetts General Hospital from June, 1900 to June, 1933 and from the Massachusetts State Cancer Hospital at Pondville from its opening in June, 1927 to June, 1933. During this time there had been in those two hospitals 1,218 cases of carcinoma of the cervix. Early in the study it was clear that many of the cases fell into different categories. After a careful operative description was obtained it was found that 22 cases called carcinoma of the retained cervix were really recurrences in the vaginal vault following total or panhysterectomy. In another group of 23 cases it was evident that the cancer had been present at the time of the original operation, for the patient had been treated for it within a year or less from the first operation. Surely these cases could not be classified as true cancers of the retained cervix. In still another group of 9 cases it was found that the original operation had been done for adenocarcinoma of the body of the uterus and that the appearance of cancer in the stump was a recurrence of the original adenocarcinoma. These cases were placed in a separate

*Read at the Forty-Eighth Annual Meeting of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons, held at Skytop, Pa., September 16 to 18, 1935.

vessels have been described by several authors,^{6, 9} and I have made mention of them and submitted photomicrographs in a recent publication.²

The second type of lesion which I have observed in placental vessels is that which takes place upon the disintegration or collapse of the field to which the individual vessel is distributed. This regressive obliteration of the vessel we find occurring physiologically at the margin of the placenta. We find it also among the vessels adjacent to areas of massive necrosis and in instances of missed abortion when a widespread degeneration of the placenta has taken place. These alterations are similar in nature to that which takes place in umbilical and hypogastric arteries after the fetus is born. They are not mani-

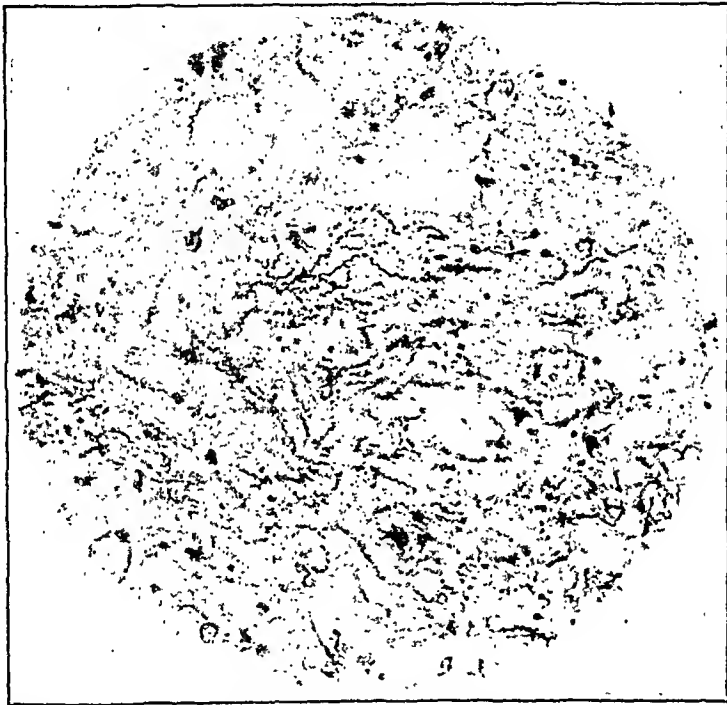


Fig. 14.—Section of fetal liver from macerated stillbirth with congenital syphilis. The necrotic organ is riddled with spirochetes. One never finds this picture in the placenta.

festations of chronic inflammation. These vessel lesions also have been described.⁹ While they may be present in the syphilitic placenta as well as in the normal placenta, I find nothing about them which is an indication of syphilitic disease.

SUMMARY

The question is raised as to the significance of so-called "fibrotic lesions" of the placenta. A review of the cases in which diagnoses of "diffuse fibrosis of placental villi" and "perivascular fibrosis of placental vessels" were made, reveals that the fetuses born at or near term were of average weight and that the rate of stillbirth was no higher than could be accounted for by other specific causes.

developed fistulas before death. This group of cases should be a warning to any one who attempts supravaginal hysterectomy as an operation for the cure of adenocarcinoma of the body of the uterus.

REAL CARCINOMA OF THE RETAINED CERVIX

The third and most interesting group of cases are the tumors of the retained cervix that developed at least a year after the removal of the body of the uterus. These are not great in number, and it is surprising to note how few they are compared to the great number of cancers of the cervix seen in these two institutions. Of 1,218 cancers of the cervix seen, but 26, or 2.1 per cent, were true stump cancers. Thirteen of these cases were found in the records of the Massachusetts General Hospital and 13 at Pondville. In 8 cases the original supravaginal hysterectomy had been done at the Massachusetts General Hospital. An analysis of the cases shows that 6, or 23.07 per cent, were single or had no children, and that 12, nearly one-half, had had none or but one child. These cases then as a whole did not fall into a group with frequently traumatized cervixes. Twenty-three plus per cent of nonfertility is considerably higher than the usual percentage of nullipara developing cervical cancer. Fifteen, or 61.05 per cent, or more than half of the patients, were operated upon for fibroids and later developed cervical stump cancer. There were four nulliparas and 5 patients with but 1 child that had fibroids. It is interesting to speculate why there should be such a large percentage of nulliparas and such a large number of patients with fibroids developing cancer of the cervical stump. Perhaps it is because the patient being nulliparous the cervix was neglected and not carefully inspected at the time of the original operation and perhaps fibroids dominate the picture, since the commonest cause for hysterectomy is fibroids. There is no question but what the great majority of patients with cancer of the cervical stump have been operated upon for fibroids. However, it may be that the uterus of these patients (three of the nulliparas were married) was abnormal. The presence of fibroids and sterility or the presence of fibroids even in multiparas usually indicates a hypoplastic type of uterus. It is possible that the cervical stump of such a uterus does not have a normal defense against cancer-forming factors. Certainly here is material for speculation. The age distribution was about as usual for cervical cancer: 2 in the third, 10 in the fourth, 9 in the fifth, and 5 in the sixth decade. One patient had a cauterization of the cervix one year before the original operation and another six years previously, and 2 had the endocervix cauterized at the time of the hysterectomy. One patient had a repair of the cervix some time previous to her operation. These cases show that cauterization or repair is not an absolute safeguard against the development of this tumor. Coning out the endocervix from above, a method of prevention of cancer of the retained cervix practiced by many surgeons, is not

a. d. Path. Inst. d. Univers. Helsingfors 6: 377, 1931. (11) *Riviere, M.*: Gynec. et obst. 22: 481, 1930. (12) *Runge, H., and Hartman, H.*: Arch. f. Gynäk. 39: 51, 1929. (13) *Strachan, Gilbert L.*: J. Obst. & Gynec. Brit. Emp. 30: 611, 1923. (14) *Lawrence, J. Stuart*: AM. J. OBST. & GYNEC. 25: 633, 1933.

DISCUSSION

DR. JAMES R. MCCORD, ATLANTA, GA.—Up to the present time I have examined some 3,000 placentas and about one-half of them have been from women with a strongly positive blood Wassermann reaction. Formerly I believed that there was a definite histologic appearance of the placenta that was a constant pattern for syphilis, but I no longer think that is true. I still believe, however, that in a placenta, at or about term, where there is definite crowding of the villi, absence of the blood vessels, and an increase of stroma cells, the condition is usually syphilitic. The more premature the placenta the greater the difficulty one encounters in making a diagnosis of placental syphilis.

In studying placental syphilis it is important that one cut his own sections, taking several from different parts of the placenta. I have always been wary of the diagnosis of placental syphilis from one small, suspicious part when the rest of the placenta appeared to be normal. There are, however, other methods that are better which should be used in the diagnosis of congenital syphilis, finding of the organisms of syphilis in the baby and, more particularly, the long bone changes as revealed by the x-ray.

I have been more fortunate than Dr. Montgomery in that I have found the organisms of syphilis in several placentas although I have made relatively few such examinations. I have found the organisms of syphilis in the placenta when I could not prove that the baby was syphilitic; and, I have been unable to find the organisms of syphilis in the placenta when I had proved that the baby was syphilitic.

DR. JAMES E. DAVIS, ANN ARBOR, MICH.—A sufficient number of placental sections are often not read to give the entire story of its pathologic changes, and the selection of sections from the gross specimens will often predetermine the conclusions that will be reached in the study of the sections.

In regard to the question of fibrosis, tissues will differ according to their inheritance quality. They will also differ, of course, in accordance with their nutrition, other factors that are purely pathologic, but most changes in the placenta are largely dependent upon the vascular supply. One may find the vascular supply in one section very efficient and in another very inefficient. The stromal content of the tissue in one zone may also vary from that in another zone. The chorion laeve zone and the perivascular areas will show relatively more connective tissue, and this again is directly dependent upon the vascular supply.

DR. MONTGOMERY (closing).—Dr. McCord has made the statement that the diagnosis of syphilis from the examination of the placenta is made more easily at full term than in the premature baby. This, I think, is particularly true when the baby is stillborn, and has perhaps been dead for a period of four to six weeks or more, in which instance we find the indications of immaturity of the placenta, which have so frequently been mistaken for evidences of chronic inflammation.

Only two types of vessel lesion are detected in the placenta: first, acute inflammation, which is characterized by an infiltration of leucocytes and is associated with long labor, premature rupture of the membranes, and trauma of operative delivery; and, second, collapse and obliteration of fetal vessels, a regressive change which is found in the neighborhood of massive areas of necrosis of the placenta. In previous contributions I have taken the stand that the collapse and obliteration of the fetal vessels is secondary to the necrosis of the corresponding villi, rather than the cause of it.

for five years and six months. Two of the living patients were of the A group, that is confined to the cervix, and two in the C group, or cancer with suspected extension to the broad ligaments. One of the living patients had adenocarcinoma and the other 3 epidermoid carcinoma. Five patients developed fistulas following treatment. Of the living patients 3 had but 1 child, 1 had no children, and all 4 had fibroids. Thus it can be seen that a salvage of 7.6 per cent of patients alive for four years is much less than would be expected in a series of cancers of the cervix.

This group teaches us that nulliparous cervixes are dangerous when left after supravaginal hysterectomy and that the badly lacerated cervix is not the only potentially dangerous cervix. It is obvious that patients with fibroids are quite susceptible to cancer of the cervix. Careful inspection, therefore, of the retained cervix is important after all supravaginal hysterectomies.

DISCUSSION

Because there were so few real cases of cancer of the cervical stump in comparison to the total number of cancers of the cervix in a large general hospital and in a large State Cancer Hospital further investigations seemed to suggest themselves. It is not possible to determine the percentage of cancer of the cervix in a given population because in vital statistics carcinoma of the cervix and body are included under a single heading, carcinoma of the uterus. It is also not possible to determine the accurate incidence of cancer of the retained cervix by following up each patient after a supravaginal hysterectomy because all patients would have to be followed for at least twenty-three years (as one of our patients did not develop cancer until twenty-three years after the hysterectomy) and such a study would be impossible. Further it would be interesting after discovering the percentage of incidence of cancer of the cervical stump following supravaginal hysterectomy to know the difference in mortality between total or panhysterectomy and subtotal or supravaginal hysterectomy. In the Massachusetts General Hospital series these figures are as follows: 224 total hysterectomies with a mortality of 4.4 per cent, and 1,771 supravaginal hysterectomies with a mortality of 2.9 per cent, a difference in mortality of 1.5 per cent or more than twice the incidence of cervical stump cancer in the same hospital (see below). There are many advocates of total hysterectomy, and in view of our findings, it would be interesting to know the mortality and morbidity of total hysterectomy in the hands of various operators. Do these surgeons advocate it only for patients with a badly torn or infected cervix when hysterectomy is indicated? The fact that so many of our patients were nulliparas or had had only one child makes it seem necessary for the advocates of total hysterectomy to advise it in *every* case. Total hysterectomy is certainly not advised in every nullipara, and yet, according to our study, it should be.

Urinary incontinence usually may be considered under the following headings: those due to (1) congenital or neurogenic causes; spina bifida, extrophy of the bladder, syphilis, cord lesions, congenital defects of the vesical sphincter, ectopic ureters, etc. (2) Acquired defects of the vesical-control mechanism usually (a) trauma or relaxation of the vesical neck (due most often to dystocia, defective tissues, senility, etc., (b) relaxation of vesical neck associated with marked cystocele or prolapse. (3) Vesical fistula with urethra and vesical sphincter intact. (4) Loss of urethra and vesical sphincter.

Several considerations are important in the treatment of these cases. Certain patients cannot be classified as absolutely cured. Especially is this true in cases where there is a lesion or functional incompetence of the vesical neck. The simple vesicovaginal fistula either leaks or does not; whereas the patient, who has a synthetic vesical sphincter constructed or who has a normal vesical neck artificially made tighter but under poor nervous control, can scarcely be expected to have a perfect functional result. Repeated operations through scar tissue and the necessity of employing the thinned-out atrophic structures add to the operative difficulties. The anatomy of the vesical neck is insufficiently understood. The vesical neck is produced by thickening of musculature and submucosa which forms a ring about the orifice which functions as a sphincter, i.e., the sphincter vesici internus. In addition, but in the female essentially, continuous with the structure of the vesical neck, there is an external sphincter which is essentially voluntary in function. The hypogastric and pelvic sympathetic nerves carry the impulses, and there is a balanced antagonism of reflex sphincter and bladder muscle stimulation and inhibition. Incontinence as well as acute retention occurs in cerebrospinal syphilis, in cases of congenital defects of the bladder and tumors of the cord.

I. CONGENITAL DEFECTS

Occasionally we see cases of a congenital type of incontinence characterized by incontinence without recognizable anatomic defects. Case 1 shows such a condition. These patients have apparently an uncertain nervous control over the vesical sphincter.

The patient, thirteen years of age, came to the hospital for incontinence of urine. She had been incontinent since birth. There was no history of any urologic disease, and neurologic findings and cystoscopic examination were completely negative. She voided regularly, and had no difficulty in emptying the bladder. There was slight constant dribbling of urine. Ectopic ureteral orifices were ruled out as nearly as possible. Upon withdrawal of urethroscope it was found that the internal sphincter remained open even after the instrument had been withdrawn down the urethra 1 cm. from the internal sphincter. The anterior half of the neck was seen to close but the posterior half remained definitely open. The situation thus being one of mechanical insufficiency, it seemed advisable to attempt to improve the competency of the sphincter by simple plication. This was performed by the Kelly technic consisting of a longitudinal denudation, mattress sutures being placed in the vesical neck and the neck being marked out by the means of a Pezzer catheter. This patient is markedly improved, especially in her diurnal control.

Richardson, the originator of an excellent method of total hysterectomy, begins a paper on this subject as follows: "in sponsoring a new and simplified technic for total removal of the uterus by the abdominal route, I wish to go on record as being emphatically opposed to the adoption of this more radical operation as a routine procedure whenever hysterectomy is indicated. Unless it can be clearly demonstrated that the cervix is the seat of menacing pathology, I am convinced that for benign disease of the uterus it is both saner and safer to perform subtotal hysterectomy. The rare incidence of carcinoma in a normal cervix left in situ is a negligible danger compared with the morbidity and mortality that would necessarily follow the universal adoption of routine panhysterectomy by any method." His words are of great value and should carry a convincing appeal to most surgeons. Masson writing for the Mayo Clinic advises a careful selection of cases for the more radical operation. He writes as follows: "If total hysterectomy is performed only in simple cases, and no attempt is made to remove the cervix at the primary operation if there is inflammatory disease of the adnexa or degeneration in a low-lying fibroma, or if the patient is obese, the risk should be but little more than that of supracervical amputation. On the other hand, if total hysterectomy is performed only in the complicated and difficult cases, especially those in which there are complications as the result of inflammatory disease, the mortality, and morbidity will be much higher. Myomectomy should be performed during the childbearing period in preference to either of the more radical procedures when it is practicable, but if tumors are multiple the former may be more difficult, and in some cases in which the cervix is in good condition it is advisable to remove the uterus by the supracervical method."

These quotations have a great similarity and most important is the opinion that the healthy cervix may be left in place. The figures of the present paper, however, show that it is impossible to determine when a cervix is safe from the possibility of later development of cancer even the nulliparous.

Figures and percentages arrived at from a study of material of the Massachusetts General Hospital are illuminating. There were 39,930 married women over the age of thirty admitted to the hospital wards for all reasons from June, 1900 to June, 1933 and there were 751 patients with cancers of the cervix admitted to the hospital in the same period of time. Thus in this population the incidence of cancer of the cervix is 1.8 per cent. It is possible that a general hospital population is not a representative group, but it is one way to obtain accurate figures. In the same thirty-three years there were 1,774 supravaginal or subtotal hysterectomies (excluding ones done for cancer in any form or patients with amputation of the cervix) performed in the hospital, and in this period of time there were in the hospital but 13 cases of real cervical stump cancer, or 0.73 per cent. As the Massachusetts General Hospital receives patients from all the New England states, and as many of the worst and most difficult problems reach there, it is reasonable to assume that it would admit more cancers of the cervical stump from other hospitals than it would lose following its own hysterectomies. This seems a fair way to gage the occurrence of a tumor whose real incidence it is impossible to obtain by follow-up for reasons stated above. This figure,

plicated. Here we have residual urine as well as incontinence often producing vesical irritability, causing loss of urine due to contractions of the bladder which are more or less involuntary. In these cases the relaxed pelvic floor must be repaired as well to support the base of the bladder and urethra. This is necessary to give a lasting result. The type of operation advisable for this procedure may well be the cystocele operation with advancement of the bladder as recommended by Ward. This is carried out by means of advancement of the bladder with the usual T-incision, the fascia is mobilized laterally and the vesical sphincter shortened by the Kelly procedure, and the fascia is then sutured under the bladder after it has been advanced, after which the mucosa is repaired along the usual lines of incision. Certain cases with marked relaxation resist ordinary tightening of the

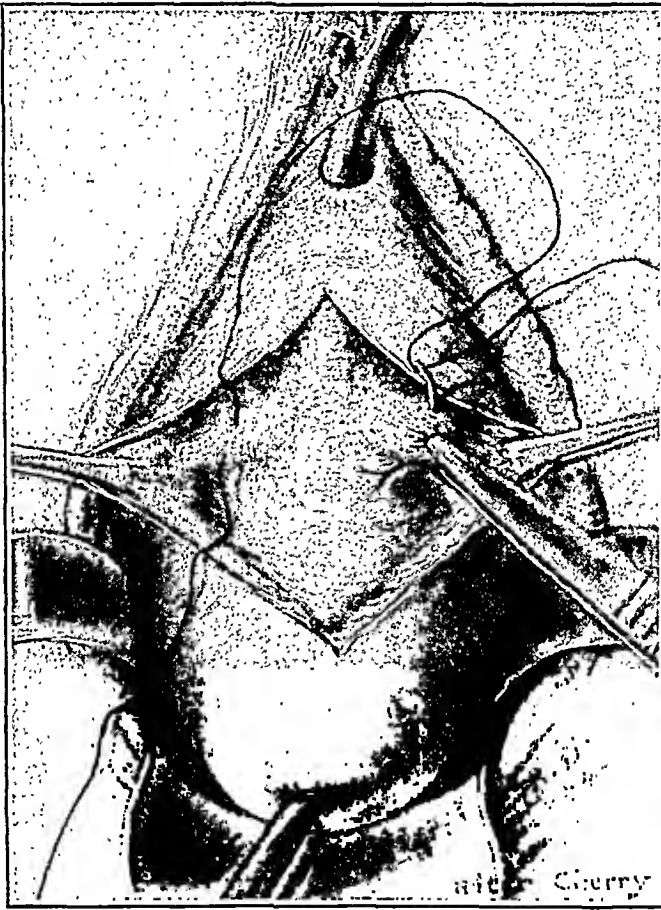


Fig. 2.—Kelly operation. Plication of vesical neck.

sphincter vesici by the commonly used Kelly method. In these there is usually marked thinning of the bladder wall at the vesical neck, i.e., the site of the vesical sphincter which is usually readily distinguished at operation. Where it is very difficult to imbricate the relaxed tissue of the vesical neck about a Pezzer catheter, the trouble lies in the fact that only very small superficial sutures may be taken in placing the mattress sutures employed by the Kelly technic. Unless extreme care is employed there is danger of penetrating the vesical mucosa and a subsequent development of a fistula, a most troublesome and embarrassing accident. This situation may be met by several methods among which are advancement of the urethra or the placing of superimposed small purse-string sutures, invaginating the redundant tissue into the bladder by the method of Gersuny and Saenger. This produces a plug mechanism which aids in restoring the competency of these thinned-

or total hysterectomy. Cauterization is a safe procedure also, and it is perfectly sound to rely upon it if it is done thoroughly and deeply enough. The author does not advocate total hysterectomy routinely but does advocate it in those cases where repair or amputation is difficult and where cauterization is out of the question. The doing or not doing of a total hysterectomy is up to the individual surgeon and to his study of the individual case, and no dogmatic rules can be laid down. Too much serious criticism of subtotal hysterectomy and too much enthusiasm for the total operation can and will of necessity cause an increasing number of deaths and many invalid patients.

The work of Hinselmann and Schiller in enabling the surgeon earlier to detect leucoplakia in its various types by the use of the colposcope and Lugol's solution should aid in the proper selection of cases for total removal of the uterus. Certainly leucoplakia, although not always developing into cancer, is a preeancerous lesion. It occurs in the unmarried as well as the married and proper recognition of such cervixes might lessen the incidence of cancer and thus save many more lives than routine total hysterectomy and its accompanying mortality.

CONCLUSIONS

1. In approaching pelvic surgery, inspection of, Schiller test of, and colposcopic examination of the cervix are necessary parts of the physical examination.
2. Careful examination of the cervix in the operating room before deciding the type of operation to be performed is essential.
3. Total hysterectomy cannot be advocated in every case, but it should be if the reasoning of its proponents is correct. Supravaginal hysterectomy should not be advocated for every case, as a badly lacerated and infected cervix is a menace. The decision should be made by the individual operator in each individual case.
4. Nulliparous cervixes are dangerous and especially so are the cervixes left behind in nulliparas who have had fibroids.

REFERENCES

- Bartlett, Marshall K., and Simmons, Fred A., Jr.: *Surg. Gynec. Obst.* 55: 777, 1932. Burch, J. C., and Burch, L. E.: *AM. J. OBST. & GYNEC.* 21: 704, 1931. Counsellor, Virgil S.: *Surg. Gynec. Obst.* 50: 644, 1930. Essen-Möller, Elis: *Surg. Gynec. Obst.* 46: 187, 1928. Farrar, Lillian K. P.: *Surg. Gynec. Obst.* 60: 826, 1935. Fullerton, W. D., and Faulkner, R. L.: *J. A. M. A.* 95: 1563, 1930. Graves, Wm. P.: *AM. J. OBST. & GYNEC.* 12: 217, 1926. Masson, J. C.: *Collected Papers of Mayo Clinic* 19: 522, 1927. Mcigs, Joe V.: *Tumors of the Female Pelvic Organs*, New York, 1934, The Macmillan Company. Phaneuf, Louis E., and Belson, Maurice O.: *AM. J. OBST. & GYNEC.* 25: 262, 1933. Von Graff, E.: *AM. J. OBST. & GYNEC.* 28: 18, 1934.

In 1927, Young reported a cure of a patient who had had eleven unsuccessful operations during a period of three years. His method is extremely good. Suprapubic incision is made following complete urologic investigation, the bladder incised, the fistula elevated by a hook, circumcised, and closed by purse-string sutures about the finger in the vagina.

We have had three successful cases whose fistulas developed following pan-hysterectomy and who had had repeated operations by the classical method which we repaired at one procedure by the transvesical route. Suprapubic transperitoneal operations have been advised (Leguacu, 1914). The extravescical route is used, the

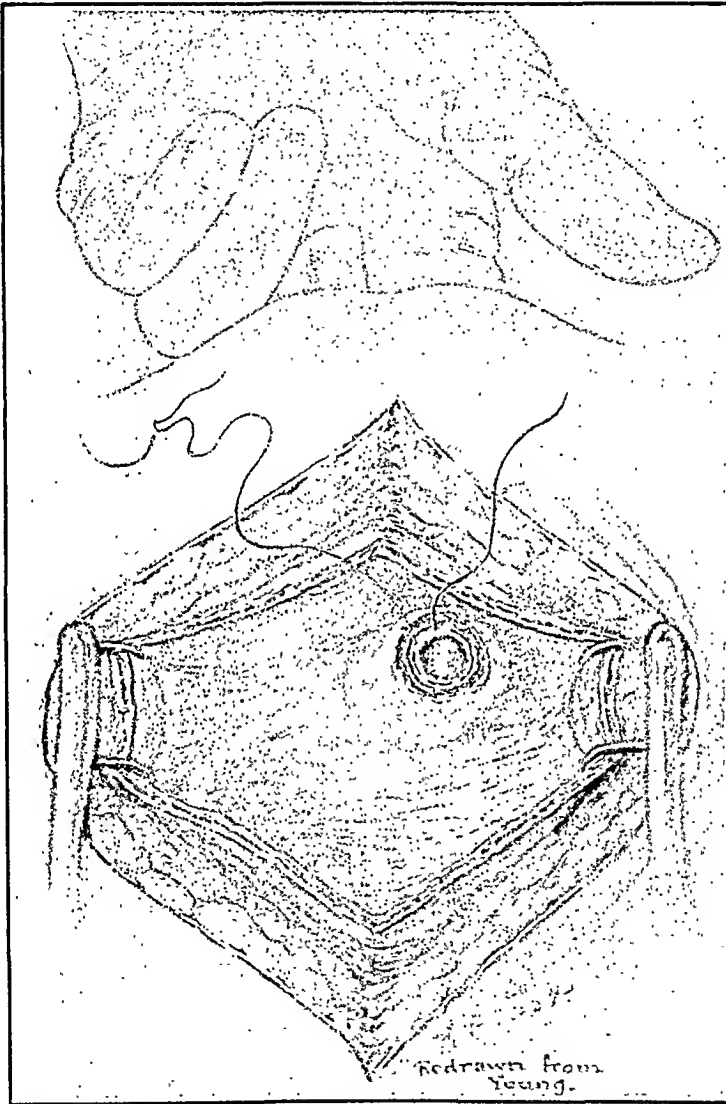


Fig. 4.—Transvesical approach (Young) showing invaginated bladder and purse-string sutures easily placed.

mobilization of the bladder being carried out as in doing a hysterectomy. We have had no experience with this method. In our hands the classical method, with marked mobilization of the bladder and fistula in large fistulas, and the Young operation in certain cases are the advisable procedures.

IV. LOSS OF URETHRA AND VESICAL SPHINCTER

Destruction of the urethra and vesical sphincter are extremely difficult cases with which to deal. Flap operations and many tunneling methods have been used by

Operative Treatment of Urinary Incontinence. Dr. Marion Douglass, Cleveland, Ohio. (For original article, see page 268.)

Intermediate Repair of Injuries Resulting from Childbirth. Dr. S. E. Tracy, Philadelphia, Pa. (For original article, see page 333.)

The Effect of Excessive Cigaret Smoking During Pregnancy. Dr. A. M. Campbell, Grand Rapids, Mich. (To appear in the March issue of the JOURNAL.)

Sterilization of the Female by Coagulation of the Uterine Cornu (Motion Picture). Dr. Mortimer Hyams, New York, N. Y. (This procedure was described and published in the Transactions of the Association for 1934.)

Maternal Mortality and Maternal Mortality Rates. Dr. James Young, London, England. (For original article, see page 198.)

Subphrenic Collection of Lipiodol Following Injection into Fallopian Tube With Observations on Reverse Gravitation of Pelvic Exudates and the Genitophrenic Syndrome in Women. Dr. I. C. Rubin, New York, N. Y. (For original article, see page 230.)

The Effects of Radiation on Human Offspring. Drs. James R. Miller, Hartford, Conn., and J. A. Corseaden and James A. Harrar, New York, N. Y. (To appear in the March issue of the JOURNAL.)

The Use of Corpus Luteum in the Treatment of Dysmenorrhea. Drs. Ralph E. Campbell and F. L. Hisaw, Madison, Wis. (To appear in the March issue of the JOURNAL.)

Occipitoposterior Positions. Dr. S. A. Cosgrove, Jersey City, N. J. (To appear in the March issue of the JOURNAL.)

Carcinoma of the Retained Cervix of Subtotal vs. Total Hysterectomy. Dr. J. V. Meigs, Boston, Mass. (For original article, see page 358.)

Pelvic Measurements in the White and Colored Female for Comparison. Dr. W. T. Pride, Memphis, Tenn. (To appear in the March issue of the JOURNAL.)

Abscess of the Ovary. Dr. W. T. Black, Memphis, Tenn. (To appear in the March issue of the JOURNAL.)

George Gellhorn

It is with deep regret that we announce to the readers of the JOURNAL the death of George Gellhorn, a member of the Advisory Editorial Board since its inception as well as a frequent contributor to its pages, January 25 in St. Louis.

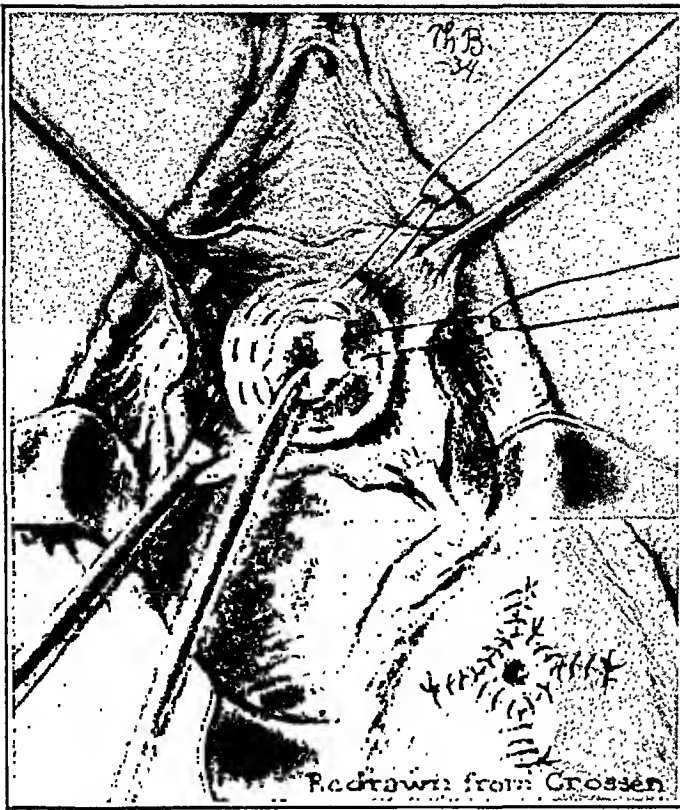


Fig. 6.—Procedure applicable to destruction of the urethra and vesical sphincter, consisting of invagination of the vesical wall inside of successfully tied and invaginated purse-string sutures.

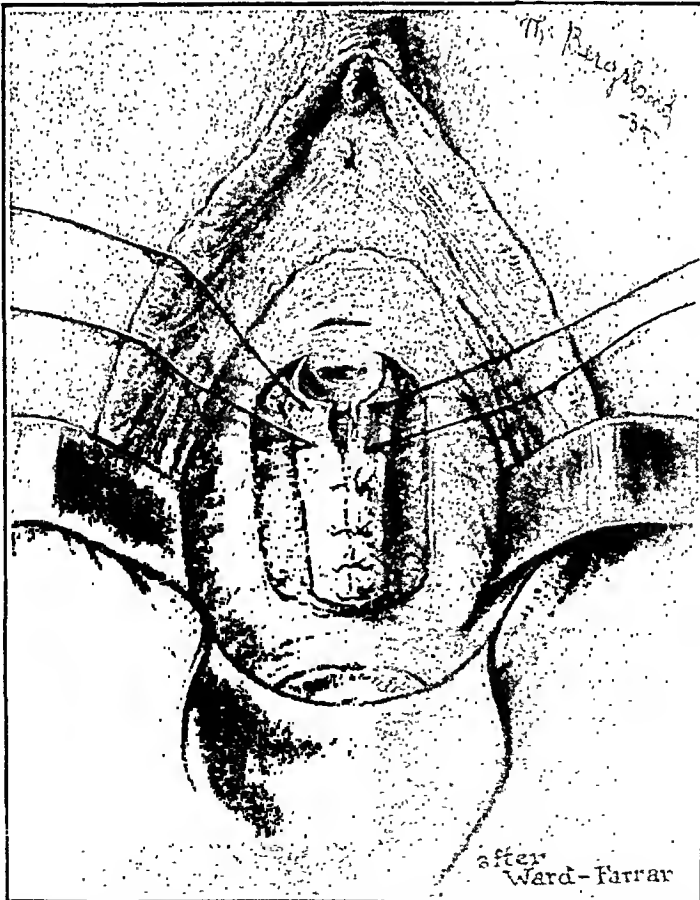


Fig. 7.—The Ward-Farrar operation showing construction of mucosal tube to be placed as new urethra.



GEORGE GELLHORN
1870-1936

(Strauss Studio)

In summary I wish to emphasize that treatment of urinary incontinence demands patience, care in details of technic, and proper choice of methods.

REFERENCES

- (1) *Bonney, V.*: J. Obst. & Gynec. Brit. Emp. 30: 358, 1923. (2) *Deming, C. L.*: J. A. M. A. 86: 822, 1926. (3) *Dougal, D.*: J. Obst. & Gynec. Brit. Emp. 31: 46, 1924. (4) *Furniss, H. D.*: S. Clin. North America 5: 249, 1922. (5) *Kelly, H. A., and Dumm, W. M.*: Surg. Gynec. Obst. 18: 44, 1914. (6) *Taylor, H. C., and Watt, C. H.*: Surg. Gynec. Obst. 24: 296, 1917. (7) *Taussig, F. J.*: AM. J. OBST. & GYNEC. 77: 881, 1918. (8) *Van Duzen, R. E.*: Urol. & Cutan. Rev. 36: 187, 1932. (9) *Watson, B. P.*: Brit. M. J. 2: 566, 1924. (10) *Witherspoon, J. Thornwell*: Arch. Surg. 28: 548, 1934. (11) *Young, E. L.*: J. A. M. A. 79: 1753, 1922. (12) *Young, H. H.*: Surg. Gynec. Obst. 28: 84, 1919.

2065 ADELBERT ROAD

DISCUSSION

DR. LOUIS E. PHANEUF, BOSTON, MASS.—In difficult cases, where other methods have failed, the extraperitoneal approach through a Pfannenstiel incision may be successful. This particular method, which is not mentioned in Dr. Douglass' paper, has served me well in one case, where I successfully closed a bladder fistula after having failed at five previous operations performed through the vagina and through the bladder.

My experience differs from that of the essayist in the use of the transvesical route in the closure of a vesicovaginal fistula. He reports three cured cases; I have used the method four times and failed each time.

The vesical sphincter is a poor sphincter at best and the results obtained by surgical procedures on the neck of the bladder depend, to a great extent, upon the condition of the tissues at the time that operation is performed. I have found the Kelly technic satisfactory in a number of these patients, the best results being obtained in those women who were operated upon early after the appearance of incontinence, before the tissues had undergone marked atrophy. My poorer results were obtained in the group of older patients where there was so much loss of sphincter tissue that shortening of this structure gave but little control.

At the 1924 meeting of this Association, held in Cleveland, H. Dawson Furniss presented an ingenious method of suprapubic sphincter tightening through a median, extraperitoneal suprapubic incision over a Pezzer catheter. He claimed to have obtained the idea from F. C. Holden who in turn had obtained his idea from Todd of Texas. This method is useful where the vagina is very contracted, where the vaginal mucosa is thinned out, where a previous Kelly operation has failed, and where the Watkins interposition operation and other operations for cystocele and vesicovaginal fistulas have previously been performed.

Repair of the pelvic floor, as advocated by Dr. Douglass, is important where there is marked relaxation of the vagina, the repaired pelvic floor obviously giving support to the base of the bladder and urethra.

I am in complete agreement that the best treatment of extravescical ureters and exstrophy of the bladder is implantation of the ureters in the rectum.

Like Dr. Douglass, I feel that the results of the treatment of urinary incontinence depend on the choice of the proper procedure, a meticulous technic and painstaking after-care.

DR. WILLIAM H. WEIR, CLEVELAND, OHIO.—Years ago, most of these lesions were due to labor, and the vaginal route was naturally the easiest and safest, for at that time any intraabdominal procedure was dangerous. With the development of abdominal surgery and an increase in the number of hysterectomies, there has been

If one measure of satisfaction is depth of feeling—then greater love had few men, greater good will gave no man. If remembrance of a worker is metered by all-round service in his chosen field—then here is one who can go and never be gone. His contributions endure through the printed word; it is his character that escapes characterization. The deep tones of the organ could match his crecendo laugh, but not its contagion; only his friends can express his talent for friendship; his patients, for comprehension; his students, for inspiration; his worthy mate, his worthiness.

The Gellhorn we knew might be portrayed in the terms of certain travellers to clinics and operating rooms and laboratories, the highly selected and intimate group of fellow specialists, the Gynecological Travel Club, of which he was president in 1915. They had a way of speaking of a man as being as learned and thorough as a German, as cautious and sane as a Briton, as lucid as a Frenchman, as inventive and skillful and considerate of the patient as an American, as much of a cross among all of these as a Scandinavian; with some such combination of qualities the genial man from St. Louis could be defined. No trip of the Club ever ran on ball bearings such as the epochal tour he engineered.

Dr. Gellhorn's wide culture, his familiarity with literature, singing and pictorial art, and his incessant study, may have derived from foreign training, and his keenness for travel from an early steamship service to the Far East, but the spread and the scope of the inquiries in his special fields and the breadth and the balance of judgment were surely matters of self-growth. Here was a surgeon drilled in Germany and later active in or, as head of several hospital services and keen on visiting other operators at work, yet in no wise to be diverted from the patient as a person and from medical considerations, and producing the best of the treatises on *Non-Operative Gynecology*. (It was issued in 1923 and 1931, handicapped by being one of a series not released singly.) The presidential address before the American Gynecological Society was a masterly summary of the subject of constitution, the body as a whole and the nervous system, in their bearing on disorders of women. The papers on techniques of diagnosis and treatment and operation, including cystoscopy and vaginal disturbances, run to some forty titles. There are several mechanical perfectings such as the powder blower, the pessary for prolapse, and the colposcope simplified to be worn like auto goggles. The protein therapy for pelvic exudates which he helped develop (his milk injections) has saved many from colpotomy, and the heat treatment he urged, many from salpingectomy. His notable teaching ability is nowhere better shown than in the *Gynecology for Nurses*.

DR. FREDERICK H. FALLS, CHICAGO, ILL.—I have found that it is a good plan to use the balloon in the bladder preoperatively, to get the mobilization of the bladder wall.

There is one type of incontinence that should be considered—the type due to spina bifida. We had a colored girl with a spina bifida who had also a marked deformity of the lower extremities. Nothing could be done for her in the orthopedic department, because she had a sloughing ulcer of the buttocks due to the fact that she had sat in urine all her life. I could not operate from below on account of the lack of exposure, due to the deformities. I made a suprapubic incision, separating the recti muscles and then taking a strip from each side of the rectus fascia, sewing the strips together. With a finger of an assistant in the vagina as a guide I next made an attempt to pass a silk ligature with an aneurysm needle, underneath the urethra. Failing this, I passed a curved forceps underneath the urethra, got the fascial strip through, brought it up, and sewed it to the edge of the rectus muscle. Then when she kept the back straight it kinked the urethra and she was able to hold the urine for a period of two or three hours and she could be kept dry practically all the time during the day. The ulcerated area on the buttocks rapidly cleared up. The bladder capacity was 180 c.c.

DR. DOUGLASS (closing).—I did not mean to give the impression that I advocated the transvesical approach. I do not hesitate to use the Schuchardt incision on any case that is inaccessible, but there are certain cases where the transvesical approach gives better exposure.

As to the postoperative treatment of these patients, we keep the patient on the abdomen for practically a week, keeping the urine well acid to prevent incrustation of the sutures. I do not hesitate to do a suprapubic drainage where necessary. It often adds to the improvement materially.

Schroeder, Carl: *Hysteroscopy and Its Value*, Arch. f. Gynäk. 156: 407, 1934.

The author reviews the various attempts which have been made to popularize hysteroscopy during the last few years and explains that the objections have been difficulties in technique plus false impressions of the dangers involved. The author describes his hysteroscope, which is simple and direct, and is used under water irrigation as have been those previously described.

Careful studies have convinced the author that there is no danger of any of the water being spilled or forced out into the tubes, and the hysteroscope should therefore be used under continuous water irrigation as the inspection of the uterine cavity is markedly improved thereby.

The various changes in appearance of the uterine mucosa throughout the various stages of the menstrual cycle are described and illustrated with color charts. The uterine ostium of the tubes is also shown throughout the menstrual cycle. Attempts were made to close the tubal ostia by electrocoagulation but these attempts failed, due probably to the tremendous regenerative properties of the mucosa in these areas. The author does not believe that a reliable method of sterilization by the intra-uterine approach can be found.

Hysteroscopy is indicated whenever intrauterine pathology is suspected, and it is of special value in replacing roentgen visualization of the uterine cavity, since it is easier, safer, and cheaper.

RALPH A. REIS.

Original Communications

PRIMARY SQUAMOUS CELL CARCINOMA IN THE BODY OF THE UTERUS

GEORGE GELLHORN, M.D., F.A.C.S., ST. LOUIS, MO.

(From the Barnard Free Skin and Cancer Hospital and the Department of Obstetrics and Gynecology, Washington University)

IT IS one of the basic characteristics of cancer that it reproduces, in a disorderly fashion, the mother tissue from which it originates. Applied to the uterus, this means that cancer upon the cervix is invariably of the squamous cell variety. By the same token, cancer starting in the uterine cavity reflects the cylindrical epithelium and the glandular structure of the endometrium. Curiously enough, cases have been observed where a *primary* carcinoma of the uterine body was of the squamous cell type. Such instances are rare. In 1928, Lahm¹ could collect only about 20 authenticated cases from the German literature. In the United States, Cullen² and Norris³ each reported one case;* and the latter author quoted two pertinent observations from England.^{4, 5} More recently the French⁶ and Italian⁷ literature contributed one report each; a total of about 25 cases though some may have escaped my search, and some may never have found their way into print. At any rate the condition is sufficiently extraordinary and interesting histogenetically to justify the publication of every new case. Hence the following presentation of the two cases which I have seen personally. The first of these was published by me⁸ almost forty years ago and is described again herewith; the second came under my observation only within the last few weeks.

CASE 1.—Woman of fifty-eight years, mother of five children. Menopause eight years previously. Fairly free bleeding on three occasions, in July and August, 1895. No other signs or symptoms. Uterus almost the size of a fist, forward, freely movable. Cervix and external os perfectly normal on sight and touch. After sufficient dilatation the finger encountered, about one-half inch above the external os, a fairly hard and irregularly warty mass which occupied, in an annular fashion, the upper part of the cervical canal and the lower segment of the uterine cavity. Large pieces removed with the curette appeared macroscopically covered with a thick, bluish gray skin and, on microscopic examination, plainly showed the picture of squamous cell carcinoma. A vaginal hysterectomy with the thermocautery was performed by my chief, Prof. Maackenrodt of Berlin, on Aug. 28, 1895; and one year later, when I reported the case, the patient was still free from recurrence.

The uterus (Fig. 1) was 11.5 cm. in length; its walls were thick and contained a small intramural fibroid in the fundus. The location of the tumor, as shown in

*Smith and Grinnell (Am. J. Obst. & Gynec. 15: 834, 1928) merely mention in a brief sentence that among their series of corpus cancers, there were two squamous cell carcinomas.

NOTE: The Editor accepts no responsibility for the views and statements of authors as published in their "Original Communications."

It has been said that "this condition once rarely cured is now one which rarely ends in death, a triumph of modern gynecology."⁸ It is obvious however that this is not the case. Since nearly 6 per cent of the maternal mortality of the City of New York is due to ectopic gestation, discussion of the factors involved seems worth while. In fact the New York Committee felt "that in view of the large number of deaths from this cause an exhaustive study of the whole subject would prove extremely valuable." It is probable too that the incidence of ectopic gestation will increase. It should be easier to reduce the not inconsiderable ectopic factor than the other rates involved in the problem of maternal mortality.

TABLE I

	15 STATES	NEW YORK	PHILADELPHIA
Total maternal mortality	7,380	2,041	717
Ectopic deaths	314	120*	33†
Per cent ectopic deaths	4%	5.9%	4.6%
Died without operation	109 (34.7%)	29 (24.1%)	7 (21.2%)
Deaths from sepsis	65 (31.7%)	35 (30.4%)	8 (30.8%)
Symptoms 5 days or more	84%	79.1%	Majority

*74.2 per cent preventable, 82% physician responsible.

†66.7% preventable, 72.7% physician responsible.

These important studies invite consideration. It is not possible to draw definite conclusions, but interesting observations may be made. Not all the ectopic deaths are included, for the Children's Bureau assumes that some deaths are not properly assigned, especially in rural areas where hospitalization is less frequent. On the basis of 16,000 deaths annually assigned to pregnancy and childbirth, it is likely that about 1,000 women die from ectopic pregnancies every year. That symptoms were present for five days or more in most of these cases is significant but not surprising. That one-third of all the operative deaths were due to sepsis, and 30 per cent of all the patients were never operated upon at all, is astonishing. Transfusions were few, only 36 in 314 cases in the federal study. Gratuitous surgery and multiple operations were all too common, both the Philadelphia report and the Children's Bureau condemning removal of the appendix in the presence of blood in the abdomen. The high rate of the City of New York means either more serious cases or poorer or less fortunate surgery.

Except in Philadelphia these reports review ectopic deaths only. It is impossible to estimate total clinical experience, since the results of most operators are never published. American statistics of the last ten years of those reporting their mortality in at least 100 cases are tabulated, since in no other way at present can the results of treatment be shown.

No clear deduction can be made from the figures in Table II. The average mortality of 4.6 per cent is surpassed by those who practice immediate operation, as well as by those who do not operate until the

however, inserted to obtain material for biopsy, encountered an obstacle about one inch above the orifice and removed from this a rather large piece of tissue which, on microscopic examination, proved to be squamous carcinoma (Grade II). From these findings we deduced that we had to deal with a squamous cell cancer in the uterine cavity which with its lower pole protruded into the wide cervical canal. On June 29, 1935, the uterus was removed by vaginal hysterectomy from which the patient made a rapid and undisturbed recovery, and four weeks later a series of x-ray treatments was added.

Our preoperative diagnosis was fully confirmed on opening the uterus (Fig. 3). Almost the entire anterior wall was covered by a neoplasm which filled and distended the uterine cavity. The surface of the growth was quite uneven due to

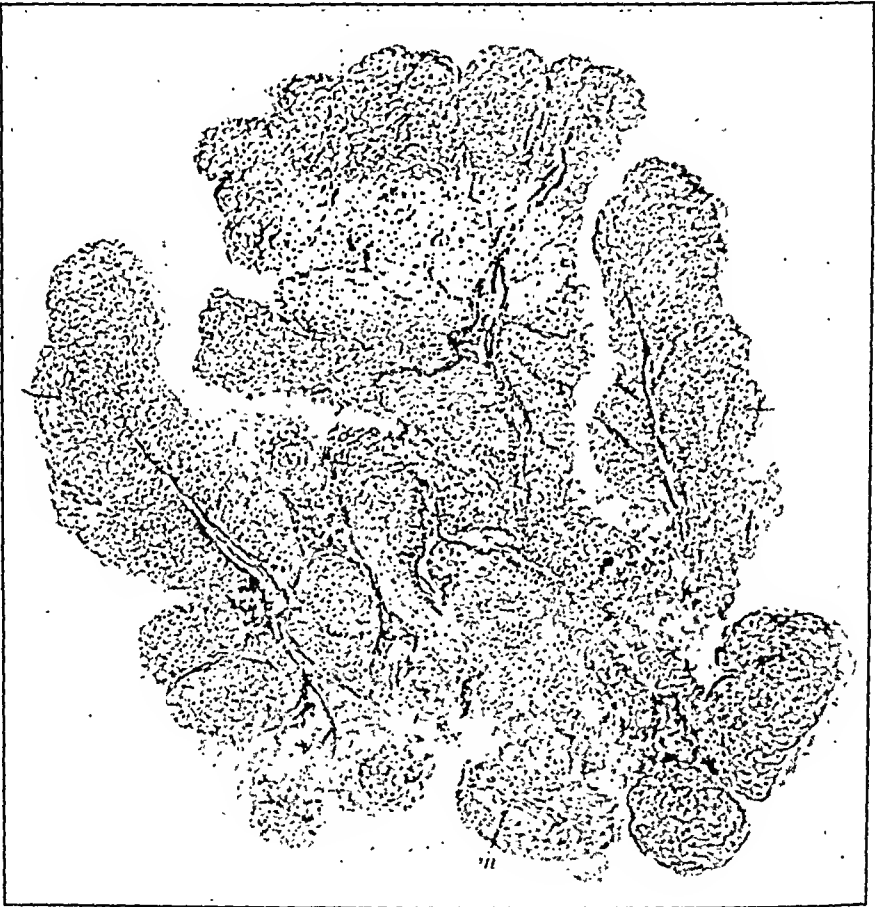


Fig. 2.

numerous crevices; here and there finger-like processes projected above the mass. The thickness of the latter ranged from 1 to 3 cm. In several places the involvement of the underlying musculature could be observed with the naked eye. On the whole, however, the development was superficial. The color of the surface was grayish white and distinctly different from the pinkish gray appearance of adenocarcinoma; just as the consistency was definitely harder than the mushy feel of the usual corpus cancer. The growth ended sharply at the internal os. The entire cervical canal was normal, and even after two months' hardening in formalin the arbor vitae is still plainly visible. The external os and the outer surface of the cervix were likewise perfectly normal.

Microscopically, the diagnosis is obvious (Fig. 4). The entire field is occupied by solid masses of cells divided by a ridge of connective tissue fibers. Nowhere is

ness, dysuria, dyschesia, slight jaundice, chill, and vomiting occur typically with repeated remissions, and are often so slight that only close inquiry will develop them. A perfect history, keeping ectopic gestation in mind, with general survey of the patient before vaginal examination is made, will suggest diagnosis.

The absence of high temperature and the complete blood picture are very helpful not only in diagnosis but also in estimating the time of rupture; falling red cell count and hemoglobin, with leucocytosis beginning in an hour or two and reaching its maximum about ten hours after rupture,^{24, 25} and returning slowly to normal does not always depend upon the amount of blood lost. Rigidity, often unilateral, is less marked than in acute appendicitis and salpingitis, and the presence of a small amount of intraperitoneal blood may be shown much more commonly than is supposed. Abdominal distention occurs typically below the umbilicus.

Vaginal examination, made last of course, may not be necessary or advisable. The pelvic mass is not essential, but it is important to remember that it grows, and that blood in the culdesac is far more tender than inflammatory exudate; pain on cervical motion is significant when acute. That negative findings on curettage are of little value has recently been emphasized by Teacher.²⁶

TEXTBOOKS

Recent textbooks do not agree on the management of critical cases, although for the most part teachers are emphatically in favor of immediate operation. Anspach^{27, 28} in his own book, as well as in the textbook edited by Curtis, says: "When the patient's condition is critical, operation must be consummated without delay. Advisability of immediate operation has been disputed in the past by a few gynecologists. The practical application of their theory was not successful," yet Curtis²⁹ himself says: "If the patient is in profound shock, temporary delay of intervention is usually advisable. . . . It is our custom to watch some of these patients rather than to operate."

Blair Bell³⁰ says: "Whichever course be pursued cases will be occasionally lost, but on the whole immediate operation holds out the best prospect for ultimate recovery. One has always to bear in mind that if the patient die in an acute case she does from hemorrhage, and that the proper surgical procedure is to find and arrest the bleeding. An operation, however, can rarely be performed within an hour or so of the primary crisis, and in that time it is usually obvious whether the patient is rallying or not. If not, no time should be lost in opening the abdomen. If the patient appears to be improving, and there be evidence of considerable intraperitoneal hemorrhage the surgeon should not leave her, but allow her to recover so far as possible and then operate within a few hours of the onset of the acute symptoms. If a sudden change occur denoting further bleeding during this period immediate operation can be performed."

Bland and Montgomery,³¹ Brady,³² Greenhill,³³ Comyns Berkeley,³⁴ J. Munro Kerr and others³⁵ say there is no expectant treatment, allowing only time enough to prepare for operation.

tinuity or through the lymphatics, to the endometrium. Even where, as for instance in the two cases reported by Mickulicz-Radecki,⁹ a direct connection between the homologous growths in cervix and corpus cannot be demonstrated grossly, serial section would reveal their interdependence.

Strictly speaking, squamous cell cancer arising in the upper part of the cervical canal and spreading into the uterine cavity, as in Cullen's² case, should likewise be excluded. But since they, too, spring from a surface normally covered with cylindrical epithelium, they may here be considered together with true primary squamous cell cancers in the corpus.

No squamous cell cancer can develop *directly* from cylindrical epithelium. The latter must needs first change into pavement epithelium. This change from one kind of epithelium into another is in itself not malignant, nor need it ever become so; it is only *potentially* a precancerous condition. Such a metaplasia has been explained in various ways.

1. In 1885, Zeller¹⁰ reported 63 cases of chronic "endometritis" in which the single cylindrical epithelium of the uterine cavity had been replaced by multiple layers of pavement epithelium. This condition which was characterized by a distinct thickening of the affected area and a peculiarly whitish and glossy appearance, was termed by him *psoriasis uteri*. In most of these cases it was known that long-continued intrauterine applications of iodine, bichloride of mercury, or carbolic acid had been made. Since such chemical cauterizations in endometritis have become obsolete, this possible etiology of an epithelial metaplasia seems to have become extremely rare. No mention has been made in recent literature, and personally I have never seen a case of this kind.

2. In a pyometra of long standing the uterine cavity is frequently lined with a pyogenous membrane which, histologically, is composed of multiple squamous epithelium. From such a matrix cancer may occasionally develop, as it did, for example, in the cases reported by Gebhard¹¹ and Flaischlen.¹²

3. In the older literature chronic endometritis was repeatedly considered capable of producing metaplasia. Today we reserve the term endometritis only to the rather uncommon inflammatory processes which take place in the stroma. The surface epithelium is for the greater part cast off; of the remaining cells a certain number may through swelling and proliferation, *resemble*, but are never changed into, real squamous cells. This etiology, therefore, is no longer applied to metaplasia.

4. In 1896, Ries¹³ described a case of chronic inversion of the uterus in which the mucosa was covered with squamous epithelium. This particular metaplasia which he called *ichthyosis uteri*, is readily explained by drying out and mechanical friction. It is, of course, as rare as the underlying condition itself.

5. Senile involution of the endometrium is possibly another etiologic factor in metaplasia and subsequent malignant degeneration, but the rarity of squamous carcinoma in the corpus renders this assumption rather problematical. In many hundreds of senile uteri I have found a *leucoplakia* only in one case. In this uterus removed from a woman of sixty-eight years, the leucoplakic area was, microscopically, benign; yet, we know that leucoplakias in any mucous membrane have a tendency toward malignant degeneration.

6. While all the metaplasias thus far mentioned, are of an *acquired* origin, the possibility of an *embryologic* etiology should not be overlooked. The muellerian ducts produce from one and the same kind of cells highly differentiated epithelial cells in the various parts of the genital tract. In the tubes the epithelium is high, cylindrical, ciliated; in the uterine cavity it is more cuboidal in shape and also

ceases with expulsion of the ovum; while in the other, hemorrhage may continue whether the ovum has wholly escaped or not. Intra-peritoneal hemorrhage can arise anywhere in the tube, and the amount of blood lost does not depend solely upon the site of rupture.

The rule is repeated rupture. For practical purposes pain is peritoneal in origin, and pain means rupture. From the statistics of those who await reaction and since most patients have symptoms for a week or more, it is probably true that death but rarely quickly follows primary rupture. Even where death seems imminent it may often be averted by quick skillful operation, or by deferring operation until supportive treatment lessens the risk. Good results follow both methods of treatment, and it should be conceded that death may occur because of as well as in spite of treatment.

It is generally taught that death is almost invariably due to hemorrhage, or hemorrhage and shock, yet it has been shown that sepsis is an important factor. Shock and hemorrhage are different, yet Blalock⁴¹ has shown that increased blood concentration, negative response to transfusion and marked alterations in the tissue can be produced by hemorrhage too. Certainly in ectopic hemorrhage and shock are for practical purposes synonymous.

Wiggers⁴² says that more than half of the blood volume calculated at 8.8 per cent of body weight may be lost without immediate or subsequent fatal effects, thus showing the high margin of safety.

The mechanism of reaction is fairly well established—spleen and peripheral arterioles contract, and within a few hours plasma is increased by reabsorption from tissue spaces, the red cells and hemoglobin thus slowly decreasing. Blood volume may be increased greatly by use of concentrated intravenous glucose, yet it appears that if hemoglobin falls below 20 per cent, increase in blood plasma is without benefit. Low blood pressure due to diminished blood volume can be permanently raised by transfused blood which contributes oxygen carriers as well.

Cannon⁴³ says that a low pressure barely sustained or already low or only recently restored may be seriously reduced by operative procedures.

It is essential to ligate bleeding vessels, but it is not good judgment to interrupt compensatory reaction. Few patients can be operated upon within an hour or two of rupture. Either hemorrhage has stopped only to begin again, or it is still going on. Any treatment may be as dangerous as the condition itself. Fine judgment is necessary. It should be obvious that if most cases show reaction, the inexperienced occasional operator, at least, will lower his mortality by waiting for it. Why teach that immediate operation should be done no matter what the condition of the patient? Certain death without operation should be the only consideration compelling operation in poor surroundings with inex-

by me²¹ elsewhere, this operation loses to a great extent the character of a major and serious interference. It may seem superfluous to emphasize this point in connection with the present discussion, were it not for the fact that there are still medical schools in this country where vaginal hysterectomy is not taught at all, and hospitals where this operation is never performed.

SUMMARY

Two personal observations of primary squamous cell carcinoma in the body of the uterus are recorded and added to the very scanty international literature on the subject. Squamous cell cancer cannot develop directly from the cylindrical epithelium of the endometrium. There must first occur as a connecting link a change from the cylindrical into pavement epithelium. This metaplasia may be either the result of certain conditions acquired during the lifetime of the individual, or it may be the expression of a faulty embryonic development. Both these etiologic factors are discussed briefly. The treatment is by operation rather than by radiotherapy.

REFERENCES

- (1) *Lahm*: Biologie u. Pathologie des Weibes, ed. by Halban and Seitz 4: 718, 1928.
- (2) *Cullen*: Cancer of the Uterus, New York, 1900, D. Appleton-Century Co., p. 578.
- (3) *Norris*: Am. J. Obst. 58: 787, 1907.
- (4) *Batchelor*: Tr. Obst. Soc. London 45: 374, 1903.
- (5) *Keith*: Tr. Path. Soc. London 56: 365, 1905.
- (6) *Géry and Perrot*: Ann. d'anat. path. Paris 9: 317, 1932.
- (7) *Morra*: Riv. ital. di gin. 12: 261, 1931.
- (8) *Gellhorn*: Ztschr. f. Geburtsh. u. Gynäk. 36: 430, 1897.
- (9) *Mickulicz-Radecki*: Zentralbl. f. Gynäk. 58: 850, 1934.
- (10) *Zeller*: Ztschr. f. Geburtsh. u. Gynäk. 11: 56, 1885.
- (11) *Gebhard*: Ibid. 24: 1, 1892.
- (12) *Flaischlen*: Ibid. 32: 347, 1895.
- (13) *Ries*: Am. Gynec. & Obst. J. 8: 184, 1896.
- (14) *Natanson*: Monatschr. f. Geburtsh. u. Gynäk. 26: 350, 1907.
- (15) *Sitzenfrey*: Ztschr. f. Geburtsh. u. Gynäk. 59: 385, 1907.
- (16) *Polano*: Ibid. 67: 411, 1910.
- (17) *Meyer, R.*: Arch. f. Gynäk. 115: 394, 1922.
- (18) *Hintze*: Zentralbl. f. Gynäk. 52: 2209, 1928.
- (19) *Ewing*: Neoplastic Diseases, Philadelphia, 1928, W. B. Saunders Co., p. 596.
- (20) *Sampson*: Am. J. Obst. & Gynec. 28: 783, 1934.
- (21) *Gellhorn*: Surg. Gynec. Obst. 51: 484, 1930.

METROPOLITAN BUILDING

Repetti, M.: Experimental Studies on the Immunizing Properties of Colostrum, Folia gynacc.-demograph. 31: 505, 1934.

In studies on the defense giving power of colostrum against infections in general and *B. coli* in particular, in guinea pigs, the author found that colostrum does not play a great rôle in this respect and concludes that most likely immunity is passed on to the fetus through the placenta.

Considering the small relative amount of colostrum excreted by the human female as compared with cows, the writer comes to the conclusion that whatever protection is offered by the colostrum depends on the high protein and vitamin A content, as compared with milk.

MARIO A. CASTALLO.

James C.: Minnesota Med. 13: 822, 1930. (19) *Mcagher, William C.*: AM. J. OBST. & GYNEC. 29: 541, 1935. (20) *Ricci, James V., and DiPalma, Salvatore*: AM. J. OBST. & GYNEC. 22: 857, 1931. (21) *Sellers, Thomas B., and Sanders, John T.*: Southern M. J. 21: 283, 1928. (22) *Tyrone, C. H., Romano, S. A., and Collins, C. G.*: AM. J. OBST. & GYNEC. 30: 112, 1935. (23) *Urdan, Benjamin E.*: AM. J. OBST. & GYNEC. 20: 355, 1930. (24) *Perry Pepper, O. H., and Farley, David L.*: Practical Hematological Diagnosis, Philadelphia and London, 1933, W. B. Saunders & Co., p. 115. (25) *Kilduffe, Robert A.*: The Clinical Interpretation of Blood Examination, Philadelphia, 1931, Lea & Febiger, p. 243. (26) *Teacher, John H.*: A Manual of Obstetrical and Gynecological Pathology, London, 1935, Oxford University Press. (27) *Anspach, B. M.*: Curtis, Obstetrics and Gynecology 3: Philadelphia, 1933, W. B. Saunders Co., p. 369. (28) *Anspach, B. M.*: Textbook of Gynecology, ed. 5, Philadelphia, 1934, J. B. Lippincott, p. 446. (29) *Curtis, Arthur H.*: A Textbook of Gynecology, ed. 2, Philadelphia, 1934, W. B. Saunders Co., p. 345. (30) *Blair-Bell, William*: The Principles of Gynaecology, ed. 4, Baltimore, Wm. Wood & Co., p. 353. (31) *Bland, P. Brooke, and Montgomery, Thaddeus L.*: Practical Obstetrics, ed. 2, Philadelphia, 1934, F. A. Davis Co., p. 296. (32) *Brady, Leo*: Lewis, Practice of Surgery 11: Hagerstown, 1928, W. F. Prior Co., chap. 24, p. 24. (33) *Greenhill, J. P.*: The Practitioners Library of Medicine and Surgery 6: New York and London, 1934, D. Appleton-Century Co., p. 291. (34) *Berkeley, Comyns*: Diseases of Women by Ten Teachers, 1934, Wm. Wood & Co., p. 468. (35) *Kerr, J. Munro, and others*: Combined Text Book of Obstetrics and Gynecology, ed. 2, Baltimore, 1933, Wm. Wood & Co., p. 258. (36) *Crossen, Harry S., and Robert J.*: Diseases of Women, ed. 7, St. Louis, 1930, The C. V. Mosby Co., p. 739. (37) *Goodall, James*: Davis, Obstetrics and Gynecology 2: Hagerstown, 1934, W. F. Prior Co., Inc., chap. 14, p. 21. (38) *Litzenberg, Jennings C.*: Nelson Loose-Leaf Living Surgery 7: New York, 1928, Thomas Nelson & Sons, p. 542. (39) *Litzenberg, Jennings C.*: Davis, Obstetrics and Gynecology 1: Hagerstown, 1934, W. F. Prior Co., Inc., chap. 11, p. 11. (40) *Miller, C. Jeff*: Clinical Gynecology, 1932, St. Louis, The C. V. Mosby Co., p. 294. (41) *Blalock, Alfred*: Surg. Gynec. Obst. 58: 551, 1934. (42) *Wiggers, Carl J.*: Physiology in Health and Disease, 1934, Philadelphia, Lea & Febiger, p. 311. (43) *Cannon, Walter B.*: Traumatic Shock, 1923, New York and London, D. Appleton-Century Co.

256 JEFFERSON AVENUE

DISCUSSION

DR. S. A. WOLFE, BROOKLYN, N. Y.—Prevention of the high mortality rate in ectopic pregnancy lies largely in the effort to reduce the incidence of the critical type of case. In the Long Island College Hospital over an eleven-year period, the mortality was 5.4 per cent in a series of 149 cases. When these figures were analyzed more closely there were 3 deaths in 19 critical cases, or 15.2 per cent, whereas there were only 5 deaths in 123 of the noncritical type, or 4.05 per cent.

There are four main clinical types in which this disease appears. In the first group the history and physical findings are classical. After a period of amenorrhea, recurring attacks of pain in the lower abdomen and bleeding, tender pelvic mass, tender cervix, typical blood count, afford early diagnosis and therefore early operation, generally without mortality.

In the second group of cases, the history is oftentimes misleading. Menstruation occurs at the expected time and continues. Pain appears simultaneously or several weeks later. These patients are very frequently treated for a supposed salpingitis and pelvic peritonitis. Diagnostic difficulties can be eliminated by close attention to the history. Ascending salpingitis with peritonitis beginning after menstruation usually appears within a week after the end of the last menstrual period. In this puzzling group of ectopic gestation with atypical history and pelvic mass, posterior colpotomy should be stressed. It is safe and gives prompt diagnosis.

In the third group of ectopic patients the history is classical as in Group I, or somewhat atypical as in Group II, but the physical findings are misleading. Repeated intraperitoneal bleeding has produced large hematoceles either in the

low anyway. Since January, 1930, we have been using 1 per cent neutral acriflavine in glycerin, and the morbidity remained equally low (see Table II).

Up to the present time, that is, practically a period of eight years, the interesting fact has been that just one fatal case of thrombophlebitis has occurred and the incidence of this lesion has been materially reduced during this time. We believe these changes striking enough to indicate that considerable value is derived from the instillations. The technic of these instillations has been previously described by Brown.

The present report shows our experiences with puerperal infection over a ten-year period. Table I summarizes these experiences. By

TABLE I

NUMBER OF ADMIS- SIONS JULY 1, 1924, TO JULY 1, 1934 15,764	NUMBER OF DELIVERIES 13,237	NUMBER OF CASES OF PUERPERAL INFECTION 228			NUMBER OF DEATHS 31	
TYPE OF INFECTION	NUMBER OF CASES	AEROBIC BACTERIA	ANAEROBIC BACTERIA	MIXED BACTERIA	NEGATIVE CULTURES	MORTALITY
Acute endometritis	216	35	128	52	1	0
Pelvic cellulitis	30	8	14	7	1	0
Peritonitis	23	5	8	10	0	16
Pelvic abscess	15	5	5	4	1	1
Pelvic thrombophlebitis	22	3	13	3	3	4
Septicemia	47	18	18	11	0	10
Cases of suspected endometritis	50	0	0	0	50	0
Anaerobic organisms present in 83.3 per cent of cases of endometritis.						

aerobic bacteria, we mean such organisms as hemolytic streptococci, staphylococci and *B. coli*. Anaerobic bacteria are in the main anaerobic streptococci. We have not been classifying the anaerobic streptococci into any certain groups, but have described their characteristics and these agree almost entirely in character with the organisms described recently by Colebrook and Hare.

Colebrook and Hare have offered a practical classification of the anaerobic streptococci found in cases of puerperal infection. The basis of differentiation is the variation in cultural characteristics.

Type A, most commonly found. Opaque colonies 1.5 to 2.5 mm. in diameter. No hemolysis. Cocci size of aerobic species. Long chains rarely seen. Very unpleasant fetid odor.

Type B, transparent colonies of smaller size than Type A. No hemolysis. Usually a "micro" type, only 0.3 to 0.4 microns in diameter. Difficult to keep alive. Usually do not produce gas.

be sure whether we are dealing with an ectopic gestation, normal pregnancy, corpus luteum cyst, or other pathology. Gentle examination may be necessary under anesthesia. I believe a careful and experienced gynecologist can do less harm with the patient anesthetized than otherwise. On several occasions it has been impossible for me to finally make a diagnosis and in several instances I have made a short midline incision, briefly inspected the tubes, and if an ectopic gestation was not found, have closed the abdomen with interrupted sutures and allowed the patient to go home within a week.

DR. A. K. PAINE, BOSTON, MASS.—I would like to reemphasize the value of posterior colpotomy, especially in the differential diagnosis between early incomplete miscarriage and the slowly developing tubal abortion. After curetting a presumable early miscarriage, in which the material removed was not sufficient to make an obvious diagnosis and the possibility of tubal abortion having been considered, the posterior culdesac is opened and if necessary laparotomy can follow immediately. If the posterior colpotomy rules out the possibility of a tubal pregnancy, its use does not delay the convalescence necessary for the curetting alone.

DR. JAMES R. MILLER, HARTFORD, CONN.—In reporting maternal mortality in Hartford for twenty years, ending 1928, I attempted to make an estimate of the mortality from ectopic pregnancy, and came to the conclusion that the death rate of ectopic gestation was 4.8 per cent. Since then I have found that this estimate was too low and that it probably should have been 6 per cent or even higher.

A review of seven years subsequent to that time, in which I was able to count all of the ectopic gestation done in our local hospitals, showed 6 deaths in 205 cases, giving a mortality of slightly less than 3 per cent, so that I think in our community we have made some progress.

As regards colpotomy for diagnosis, we should always keep in mind the possibility of having sepsis as well as ectopic gestation present.

DR. FREDERICK H. FALLS, CHICAGO, ILL.—In certain of the tragic cases mentioned, the anesthesia may also add to the shock, and for that reason recently I have been using local instead of general anesthesia for most of these cases of tragic ectopic gestation. I have also felt that the vaginal route causes much less shock than the abdominal, and therefore I have operated under local anesthesia through the vagina. Instead of opening posteriorly as Dr. Babcock suggested, I have opened anteriorly in those cases in which the uterus seemed to be anterior, and posteriorly where the uterus seemed to be posterior.

DR. W. A. SCOTT, TORONTO, CANADA.—Posterior colpotomy has been carried out almost routinely at our clinic for a number of years. On a previous occasion when I mentioned the value of posterior colpotomy, it was questioned by some members and the argument brought against it was the possibility of introducing sepsis. During the last two years we have adopted in these doubtful cases of posterior colpotomy as a routine, simply using a large needle. It is done without an anesthetic, with practically no pain, in an examining room, and we have found that it is eminently satisfactory in those cases where there is much blood.

DR. L. A. CALKINS, KANSAS CITY, MO.—I have found that a great many operators in handling ectopic pregnancy will transfuse the patient either before or after operation and feel that they have done a good and sufficient job. I know of two patients within the past year who have died because they had only one transfusion when undoubtedly two or three transfusions would have produced a different result. I think that in our teaching the value of sufficient blood should be emphasized—not just “a transfusion.”

TABLE V

PATIENT'S HISTORY NO.	PURIFICATION OF PREGNANCY	INFECTED BEFORE ADMISION	ABORTION CRIMINAL	SPONTANEOUS	UTERINE CULTURE TYPES OF ORGANISMS	BLOOD CULTURE TYPES OF ORGANISMS	EXTENT OF PATHOLOGIC LESIONS AT DEATH	CHARACTER OF DELIVERY	AUTOPSY
B. II.									
0-5832	20 wk.	No	-	-	None <i>Strep. putridus</i>	Hemolytic strep.	Endometritis septicemia	Ectopic unoperated	No. 2409 Coroner's case
0-6250	2 mo.	Yes	Yes	-	Anaerobic strep.	<i>Strep. putridus</i> An. strep.	Endometritis, infarct of lung, septicemia, pelvic thrombophlebitis		
0-6783	Term	No	-	-	Anaerobic strep.	Neg.	Endometritis, peritonitis, pneumonia	Cesarean section	No
1867	36 wk. Induced	No	-	-	Anaerobic strep.	Anaerobic strep.	Acute endometritis, pelvic thrombophlebitis, septicemia, embolic pneumonia	Twins, first spontaneous, second breech extraction. Macerated fetus	No
3706	Term	Yes	-	-	<i>Strep. hemolyticus</i>	<i>Strep. hemolyticus</i>	Septicemia, peritonitis, endometritis, pneumonia	Spontaneous	No. 2784
4003	Term	?	-	-	Anaerobic strep.	Anaerobic strep.	Peritonitis, general pelvic abscess, endometritis, septicemia	Cesarean section	No. 2817
4173	36 wk.	Yes	-	-	Anaerobic strep.	Neg.	Pelvic thrombophlebitis, pulmonary embolus (Ca. of uterus)	Cesarean section. Supravaginal hysterectomy	No

first consists of the use of derivatives of opium, chiefly morphine, and is the method employed almost universally by most physicians. However, morphine is not entirely satisfactory because as the patient's tolerance for the drug increases, larger doses must be given; some women cannot take the drug because it produces nausea and vomiting, others become morphine addicts and are difficult to handle, and the drug becomes increasingly more expensive for poor patients. The second method is surgical and consists of pelvic sympathectomy and chordotomy. While the former operation is relatively simple, it requires an abdominal operation and, as we shall show, it does not relieve all patients. Chordotomy is a serious operation which must be carried out by a skillful neurosurgeon. The third means of overcoming the pain due to a malignant growth consists of blocking the nerves which conduct the sensation of pain by means of various solutions. We have used alcohol for this purpose and have injected it into the spinal column.

In two previous publications^{1, 2} we discussed the physiology of pain and the theoretic reasons for the successful results obtained by means of pelvic sympathectomy and subarachnoid injection of alcohol. We explained that since the nerve fibers of the superior hypogastric plexus are sensory and not motor, resection of the superior hypogastric plexus above the hypogastric ganglion will relieve most if not all the pain which arises in the pelvic organs. Subarachnoid alcohol injections are effective in relieving pain because they injure the peripheral nerve fibers in the posterior or sensory roots. We advised that the patient be placed on her side, with her hips elevated and turned somewhat ventrally. We suggested this posture in order to try to bring the anterior or motor roots out of reach of the alcohol which floats in the cerebrospinal fluid since its specific gravity is less than that of the spinal fluid. Since with one exception, which will be described in detail, we have encountered no pronounced motor disturbances following the alcohol injections, this posture may explain the absence of injury to the motor roots. This may be the proper explanation for the success of the cases when the injections were made in the first lumbar interspace, but it cannot explain the relief of pain when the injections are made in the fourth lumbar interspace. In the latter region we encounter the cauda equina where both motor and sensory fibers are close together. We know that sensory nerves and particularly the pain fibers are more susceptible to the effects of alcohol than motor roots. Hence in the cauda equina only the sensory nerves are affected by the alcohol. The greater susceptibility of the pain and other sensory nerves to the effects of alcohol may be explained by the diminished amount of myelinization which these nerve fibers possess. It is also probable that even in the first lumbar interspace the motor roots are reached by the alcohol but are not affected because of their heavier myelinization and lessened susceptibility.

TABLE V—CONT'D

PATIENT'S HISTORY NO.	DURATION OF PREGNANCY	INFECTED BEFORE ADMIS- SION	CRIM- INAL	ABORTION SPON- TANEOUS	UTERINE CUL- TURE TYPES OF ORGANISMS	BLOOD CULTURE TYPES OF ORGANISMS	EXTENT OF PATHOLOGIC LESIONS AT DEATH	CHARACTER OF DELIVERY	AUTOPSY
1766	5 mo.	Yes	-	Yes	<i>Strep. hemolyti- cus</i>	Neg.	Endometritis, peritonitis, pelvic abscess	Spontaneous	No. 3389
3447	Term	No	-	-	Nonhemolytic strep.	Nonhemolytic strep.	Septicemia, cerebral em- bolus, endometritis, bronchial pneumonia	Spontaneous breech (mem- branes rup- tured 36 hr.)	None
5139	Term	Yes	-	-	None (culture of pelvic abscess- anaerobic strep. <i>B. coli</i>)	Neg.	Endometritis, pelvic ab- scess	O.P.D. Short labor	No. 3792
5293	5 mo.	Yes	-	Yes	Anaerobic strep.	None	Endometritis, peritonitis, appendicitis	Spontaneous	No. 3785
5915	38 wk.	? (Mem- branes ruptured 3 days before de- livery)	-	-	<i>Staph. albus</i> Anaerobic strep.	Neg.	Endometritis, peritonitis	Cesarean sec- tion	None
6112	Term	No	-	-	None (peritoneal culture, an. strep., <i>Staph. albus</i>)	Anaerobic strep. <i>Staph. albus</i>	Septicemia, peritonitis	Spontaneous with retained placenta, supravaginal hysterectomy	None
6143	Term	No	-	-	<i>Staph. albus</i>	<i>Staph. albus</i>	Endometritis, septicemia	Cesarean sec- tion	None

portions of the spine, her back is arched as much as possible, her body turned somewhat ventrally and the head lowered slightly. By placing the patient in this attitude, we raise the sacrolumbar region of the spine to the highest level and at the same time make the posterior or sensory nerve roots lie horizontally. The anterior or motor nerve roots come to lie in a plane which is usually out of reach of the alcohol. Even if the motor nerves are not removed from the field of the alcohol, as occurs in the cauda equina, they are not often affected because sensory nerves are more susceptible than motor fibers to the effects of alcohol.

Some one should hold the patient in the proper position. A weak solution of iodine or other antiseptic is applied over the lumbar and upper sacral regions. In most of our early cases the fourth lumbar interspace was selected for the injection of the alcohol. We made many injections in the first, second, and third lumbar interspaces to see if we could relieve the pain which some women develop high up in the abdomen and back. Since this could not be accomplished in all cases and since the high injections sometimes failed to relieve all the pain in the lower abdomen and back, we are now again making all our injections in the fourth lumbar interspace. An ordinary lumbar puncture needle with a stylet is used. The needle is injected into the desired interspace just as for an ordinary lumbar puncture, and we prefer not to use novocaine in the skin before inserting the needle. After the needle is in the subarachnoid space, as evidenced by the flow of spinal fluid, 0.5 c.c. of absolute or 95 per cent alcohol is injected into the cerebrospinal fluid. For this purpose it is best to use a tuberculin syringe so as to be sure not more than 0.5 c.c. is injected. Furthermore, the alcohol must be injected very slowly, drop by drop, taking about two minutes for the injection of the 0.5 c.c. This will avoid a mixture of the alcohol with the spinal fluid. The alcohol rises immediately to surround the posterior roots because the specific gravity of alcohol is about 0.806, whereas that of the spinal fluid is 1.007. No attempt should be made to draw spinal fluid into the syringe to mix it with the alcohol because this is exactly what is *not* wanted. After the injection is made, the needle is withdrawn and the puncture hole covered with sterile gauze and adhesive. Before the injection is completed, the patient will complain that the upper leg feels numb or hot and that she cannot move the leg. The numbness is almost routinely experienced after the injection but disappears spontaneously after a few hours or few days in most of the cases. In spite of what the patient says concerning her inability to move the leg, she can easily move it when requested to do so. At the same time that the patient informs us of the numbness she also often tells us either voluntarily or in answer to our query that her pain has disappeared. The longer the patient is permitted to lie on her side, the better the results. Hence we now keep our patients on their side for two hours after the injection. Then these women are permitted to get up and walk around. Some find difficulty in getting up from a chair because their "leg is asleep." Sometimes the leg feels heavy and the patient experiences some trouble in walking up steps because the knee flexes readily. These sensations usually wear off in a few hours although in some women they last a number of weeks. Nearly all of our patients who were ambulatory went home within three hours after the injection, and no ill effects have been observed from this procedure. It is perhaps best, however, to keep the patient in a hospital for twenty-four hours.

If the patient has pain on both sides, an injection is made a week later with the patient lying on the opposite side. The same amount of alcohol is injected.

Until a few months ago we restricted the subarachnoid injection of alcohol to patients with hopelessly advanced cancer. We did this because we feared the effects of absolute and 95 per cent alcohol on the spinal cord. Since we have thus far not observed any bad effects from the injections, we injected alcohol intraspinally in six women who had severe pruritis vulvae and/or pruritis ani and obtained striking relief, thus far up to four months. To accomplish this we have slightly modified our technic.

of this group of organisms, as it is indicative of the degree of proteolytic power of organisms found in the individual cases. From the study of this particular cultural characteristic, it seems possible to draw conclusions as to prognosis with a fair degree of uniformity, that is, usually the more proteolytic the organisms found, the more active and virulent the infection.

Our experiences with puerperal infection perhaps can be studied best by referring to the tables.

In reviewing Table I, it may be seen readily that anaerobic streptococci are by far the most frequent offenders in our series. Not only is this true for endometritis, but also for the other lesions and especially conspicuous in the etiology of thrombophlebitis.

The morbidity figure for puerperal infection, which is shown in Table II, is rather low. This means a case is considered one of morbidity when the patient runs a temperature of 100.4° F. on two successive afternoons in the first ten days of the puerperium. The percentage of morbidity here stated refers only to puerperal infection. A distinct improvement occurred after the use of vaginal instillations.

In Table III, the incidence of maternal mortality, due to puerperal infection in our own cases, is recorded, a total of 13 and only 3 in the last four and one-half years, the number of deliveries over this period of time being approximately 7,000. Eight of these deaths followed cesarean section.

Table IV lists the total number of fatal cases of puerperal infection, 31 in number. Of these, 13 were our own cases, the remainder having been infected before admission to the hospital.

Table V summarizes the bacterial findings in these fatal cases. We have noted that in the entire series, anaerobic streptococci were responsible for practically half of the cases. The high incidence of *Staphylococcus albus* infection was due to the fact that this organism was present in the hospital for a period of time. When the source of this infection was discovered, no more cases developed.

Table VI reviews our experience with thrombophlebitis over the ten-year period. Note only one fatal case since 1926.

TABLE VI. THROMBOPHLEBITIS

	ADMISSIONS	DELIVERIES	NO. OF CASES	AEROBIC BACTERIA	ANAEROBIC BACTERIA	MIXED BACTERIA	NEGATIVE CULTURES	MORTALITY
July 1, 1924, to Sept. 1, 1926	2,194	1,913	9	0	6	0	3	3
Sept. 1, 1926, to Jan. 1, 1930	5,385	4,494	6	2	4	0	0	1
Jan. 1, 1930, to Jan. 1, 1933	5,381	4,472	5	1	3	1	0	0
Jan. 1, 1933, to July 1, 1934	2,804	2,358	2	0	0	2	0	0

From a survey of this report, one can readily conclude that anaerobic streptococci play the predominant part in the etiology of puerperal infection, that their presence in the vagina of a large percentage of women at term indicates that the infection is endogenous

relief from pain for eighteen days after the injection, and then developed pain in the left kidney region. The latter type of pain cannot be relieved by intraspinal alcohol injections in the lumbar region.

Among the 4 failures 1 patient had had a sympathectomy before the alcohol injection with no relief. Another failure early in our series taught us to avoid more than 0.5 c.c. of alcohol for our injections. This patient had had a pelvic sympathectomy from which she obtained relief for six weeks. Then the pains returned. She was given an intraspinal injection of 1 c.c. of alcohol and another cubic centimeter on the opposite side two days later, but experienced no relief. For three days following the second injection she had urinary retention and for three weeks she had complete loss of power and anesthesia in the left leg. She died eleven weeks after the second injection and autopsy revealed the cause for the failure of the alcohol injections. The patient had bilateral hydronephrosis and the pain due to this could not have been relieved by our alcohol injections. The paralysis and anesthesia which this patient developed were the only serious complications observed in our entire series. We believe it was due to the excessive amount of alcohol injected and to the short interval between the two injections. Since this experience, except for four injections where we used 0.75 c.c., we have injected only 0.5 c.c. of alcohol. We have encountered a few other minor disturbances after alcohol injections. These are numbness of the leg for a few days, urinary retention or incontinence for a few days and diarrhea. We have not observed any motor disturbances except in the one patient who received the excessive amount of alcohol.

At the time of injection our patients had many complications such as "frozen pelvis," pelvic masses, invasion of the inguinal glands, rectovaginal and vesicovaginal fistulas and invasion of the bladder, the rectum and the labia.

Two of our patients received injections on both sides and one patient was given an injection in the first lumbar interspace after the injection in the fourth interspace had failed to give complete relief. The average age of our patients was slightly over forty-three years which is a tragic fact when we consider that practically all of these women had hopeless cancers.

COMMENT

A comparison of the series of patients treated by pelvic sympathectomy and the patients treated by alcohol injections demonstrates conclusively that better results are obtained by means of intraspinal alcohol injections. In addition to the greater incidence of relief obtained by means of the alcohol injections this procedure is far simpler than sympathectomy.

Just as continued experience with sympathectomy toned down our enthusiasm for this operation and taught us that not all patients with advanced cancer of the cervix can be relieved by pelvic sympathectomy, so we have come to learn from our experience with intraspinal alcohol injections that some women will not be benefited by these injections. We have found that we can relieve practically all pain associated with carcinoma of the cervix except that which is due to involvement of the upper urinary tract in the form of hydroureter and hydronephrosis. This complication produces pain not only high up in the kidney region but also severe discomfort in the parametrium on the affected side. We have not been able to stop this pain by intraspinal injections in the

PELVIC INCLINATION*

A. Y. P. GARNETT, M.D., F.A.C.S., AND J. BAY JACOBS, M.D., F.A.C.S.,
WASHINGTON, D. C.

COMPARATIVELY little has been published on pelvic inclination, and the few pages devoted to this subject in the various standard textbooks of obstetrics all seem to have originated from the same source.

By inclination of the pelvis is meant the angle that the plane of the inlet makes with the horizon. With the patient in the erect posture, this is spoken of as the habitual inclination. Should one determine the inclination of the inlet in the recumbent posture using a method already described¹ and which will be referred to briefly in this paper, he need only deduct that angle from 90 degrees (Fig. 1). Whether inclination of any of the planes of the pelvis in the individual remains the same, or is altered after death, has not yet been determined. It is natural to suppose that the changes incident to, and following death, would alter inclination. This fact is mentioned because almost all observations heretofore pertaining to pelvic inclination were either based upon studies of cadavers where one can expose any portion of the pelvis, or in living subjects by noting the inclination of a line extending from the bottom of the spine of the last vertebra to the upper border of the symphysis. It may be stated that the external and the true conjugates seldom lie in the same plane.

The inclination of the plane of the superior strait has been variously estimated from 35 degrees by Levret to 75 degrees by Camper, and accepted by Cragin as averaging 60 degrees in accord with Naegele's determinations, which were made in 1819. The last named author measured the distance from the floor to the lower border of the symphysis pubis and to the tip of the sacrum, respectively. He then placed a normal pelvis in a similar position and estimated the inclination of its superior strait. Improved methods now at our command should overcome the apparent lack of interest and the neglect of opportunity for studying inclination as well as its relationship and effect upon the management of labor.

The practical importance of pelvic inclination attracted the attention of one of us (A. Y. P. G.) about eighteen months ago, when encountering a striking example in a pelvis of normal measurements that required cesarean section. Retrospection revealed some unfortunate cases, where knowledge of inclination might have had a very satisfactory effect.

*Read at the Forty-Eighth Annual Meeting of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons, held at Skytop, Pa., September 16 to 18, 1935.

rence of pain, but higher up and due to stricture of the ureter with hydroureter and hydronephrosis as a result of the growth of the cancer. They will then develop a new type of pain which thus far we have been able to relieve only by nephrectomy.

SUMMARY

During the last few years we have been interested in methods of relieving the severe pain which is associated with carcinoma of the female genitalia, especially of the cervix. We began with pelvic sympathectomy which at first seemed to give spectacular results but later proved to be less satisfactory. We performed a pelvic sympathectomy upon all patients with advanced carcinoma who had severe pain, and we observed complete relief from pain in 37.5 per cent of our first forty cases, partial relief in 35 per cent and failures in 27.5 per cent. However, when we selected only those patients who had pain in the middle of the lower abdomen, pain low in the back, rectal tenesmus, bladder pain and pain associated with vesicovaginal and rectovaginal fistulas, we relieved practically all of them completely.

More recently we have resorted to intraspinal injections of alcohol to relieve the pain associated with Group III and especially Group IV carcinoma of the cervix. Among our first forty patients taken at random we have been able to obtain complete relief in 85 per cent, partial relief in 5 per cent and no beneficial effect in 10 per cent. In some cases relief has lasted for eight and a half months. The only patients not suitable for intraspinal alcohol injections (at least in the lumbar region) are those who have pain not only in the kidney region but also in the parametrium due to stricture of the ureter associated with hydroureter and hydronephrosis.

We believe that intraspinal injection of alcohol is preferable to sympathectomy not only because it is much simpler and can be performed by any qualified physician familiar with the essential features of this procedure but also because it may be used in a greater number of cases, and it gives relief to a larger percentage of women with advanced carcinoma of the cervix.

REFERENCES

- (1) *Greenhill, J. P., and Schmitz, Herbert E.*: J. A. M. A. 101: 26, 1933. (2) *Greenhill, J. P.*: Am. Med. 40: 290, 1934. (3) *Greenhill, J. P., and Schmitz, Herbert E.*: J. A. M. A. 105: 406, 1935.

55 E. WASHINGTON STREET

25 E. WASHINGTON STREET

DISCUSSION

DR. HENRY SCHMITZ, CHICAGO, ILL.—Relief from intractable pain in cancer of the female pelvic organ is very important since all sufferers from cancer who delay diagnosis and do not receive adequate treatment will finally reach the pain stage. The choice of method of treatment of pain depends on the extent of the disease and on the cause of the pain.

degrees heretofore regarded as normal (Figs. 1 and 2). The inlet of the pelvis which Jacobs recognizes as normal is more conducive to engagement of the presenting part in any posture.

In the literature we find no indication of the average inclination of the symphysis. But by constructing a pelvigram, using the measurements accepted as normal, the inclination is found to be 54 degrees, as compared to 60 degrees in the average pelvis which we accept as theoretically accurate. The inclination of the symphysis varied between 44 degrees and 84 degrees in this study.

The fact that most obstetricians believe that in doing a pelvic examination in either the recumbent or lithotomy position, the promontory is felt above the level of the lower border of the symphysis, indicates that the inclination of the plane of the diagonal conjugate had seldom been observed in living women. The inclination of the plane of the diagonal

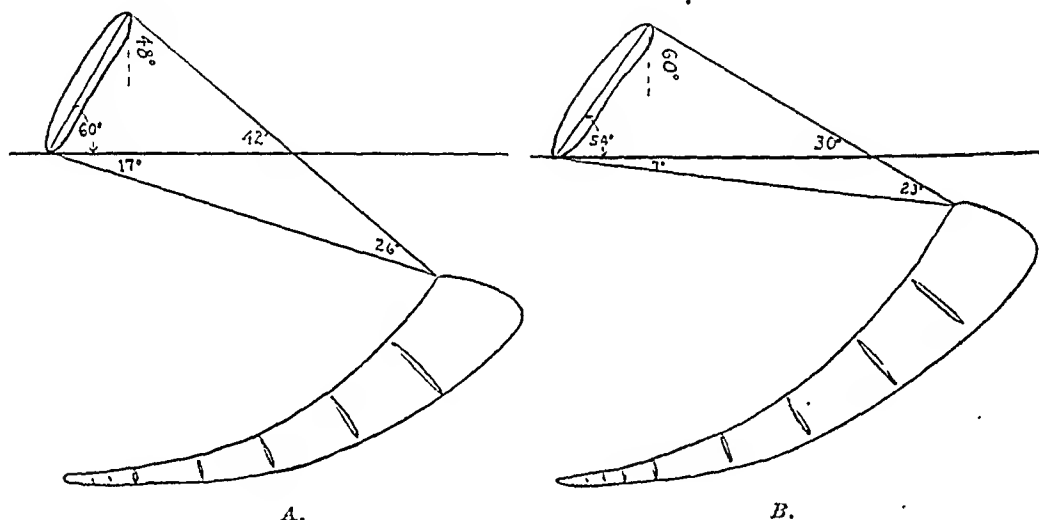


Fig. 2.—(A) Pelvigram or cross-section of the average pelvis in a series of eighty living women. (B) Using the normal measurements and pelvic inclination as accepted by Cragin (30 degrees in recumbent posture), this pelvigram was constructed. It represents the pelvis heretofore regarded as normal and is merely hypothetical, as his figures were not taken from living subjects.

conjugate varied between minus five degrees and fifty degrees. The average was 16.7 degrees as compared to seven degrees in the pelvis formerly accepted as normal (Fig. 2).

Three cases were encountered where the promontory was situated above the lower border of the symphysis with the patient in the recumbent posture. In two the inclination of the diagonal conjugate was minus five degrees and in one, minus one degree. Cases of this type must of necessity have a faulty inclination of the inlet, and a correct prognosis so far as engagement and delivery are concerned is impossible (Fig. 3). In practically all women the promontory is situated below the level of the lower border of the symphysis, with, of course, more favorable inclination of the inlet. Even in pelves of moderate size when the inclination is poor it is unusually difficult to reach the promontory.

studied before the alcohol injection is given. I believe alcohol injection will supersede resection of the superior hypogastric plexus in carcinoma cases.

DR. JAMES E. KING, BUFFALO, N. Y.—Up until about a year ago we treated the pain in cases of cervical carcinoma with morphine. I was at first somewhat opposed to alcohol injection, not because I did not believe that the alcohol if it reached the right place would correct the pain, but it seemed to me a serious procedure which might do a great deal of harm. However, the result of the first attempt was so satisfactory that we have during the last year used it in about twelve cases.

I do not see how confusion can occur between the pain that a patient experiences from hydronephrosis, and that which is due to nerve pressure. The question is rather easily settled, especially when the pain is marked. Alcohol injection has been used only in the cases where the pain was definitely pelvic. Eight of these cases have been very successful.

DR. W. WAYNE BABCOCK, PHILADELPHIA, PA.—The technique of alcohol injection may not be quite as simple for every one as it is in the hands of those who are unusually expert. With a very stout patient, it may be necessary to introduce the needle a distance of three or more inches before it reaches the spinal canal. In such a case particularly, it is difficult for me to tell just where the needle will hit the dura. The dura may be entered on the left side, the right side or in the midline. If one enters at the dependent side of the cord, the nerve roots opposite those it intended to block may first be affected. Again, one does not always know to what depth the point of the needle has entered the spinal canal; as the distance between the anterior and posterior roots is not great, the needle may pass beyond the posterior roots and deposit the alcohol about the anterior roots. Thus for accurate localization we must depend largely upon gravity as influenced by the position of the patient. Despite these possible errors, however, we must concede that the results reported have been surprisingly good.

It is evident that the concentration and dose of alcohol used is very important. From an injection of 1 c.c. I obtained a persistent motor weakness of the leg. While the patient had relief from pain, she would not permit an injection on the other side for fear she would not be able to walk.

In general, the anterior roots seem to be very much more resistant to the action of drugs than the posterior ones. For the posterior roots of a dog, a novocaine solution of the strength of 0.5 per cent suffices to produce a sensory block; for the anterior roots five times this concentration is required in order to produce a motor block. Thus it may be possible to use larger quantities of weaker solutions of alcohol, perhaps even about the cervical cord, and have motion preserved, although sensation is lost. The lower percentages of alcohol seem to be quite safe. In our clinic we have probably given for spinal anesthesia over 35,000 injections of anesthetic solutions containing from 10 to 13 per cent of ethyl alcohol, and in no case have we seen any paralysis or sensory loss from such use of alcohol. From injections of solution contaminated with 10 per cent of methyl alcohol, two patients had rather prolonged retention of urine, and a persistent weakness of the sphincters. One patient also had weakness of the perineal muscles.

The immunity of the anterior roots when only $\frac{1}{2}$ c.c. of ethyl alcohol is injected, we would attribute to the early dilution of these few drops of alcohol. It is difficult to believe that if this alcohol reached the anterior roots in concentrated form there would not have been an occasional motor loss.

DR. NATHAN P. SEARS, SYRACUSE, N. Y.—Dr. Greenhill mentioned the fact that in constricted ureters with hydronephrosis resulting, nephrectomy might be indicated. I would think that if all the indications for a nephrectomy were present

ter of the sacrovertebral promontory, will impinge against the inner face of the symphysis pubis at its lower border (Fig. 5). The sacrovertebral promontory is situated three and a half inches above the symphysis, so that the vertical line which represents the initial direction of the intra-abdominal pressure at the pelvic brim, passes over, not into, the pelvic cavity.

Engagement occurs by a movement of lateral flexion, whereby the posterior parietal eminence rises while the anterior parietal bone slips behind the symphysis (Fig. 6). This process takes a relatively long time and is usually attended with premature rupture of the membranes and

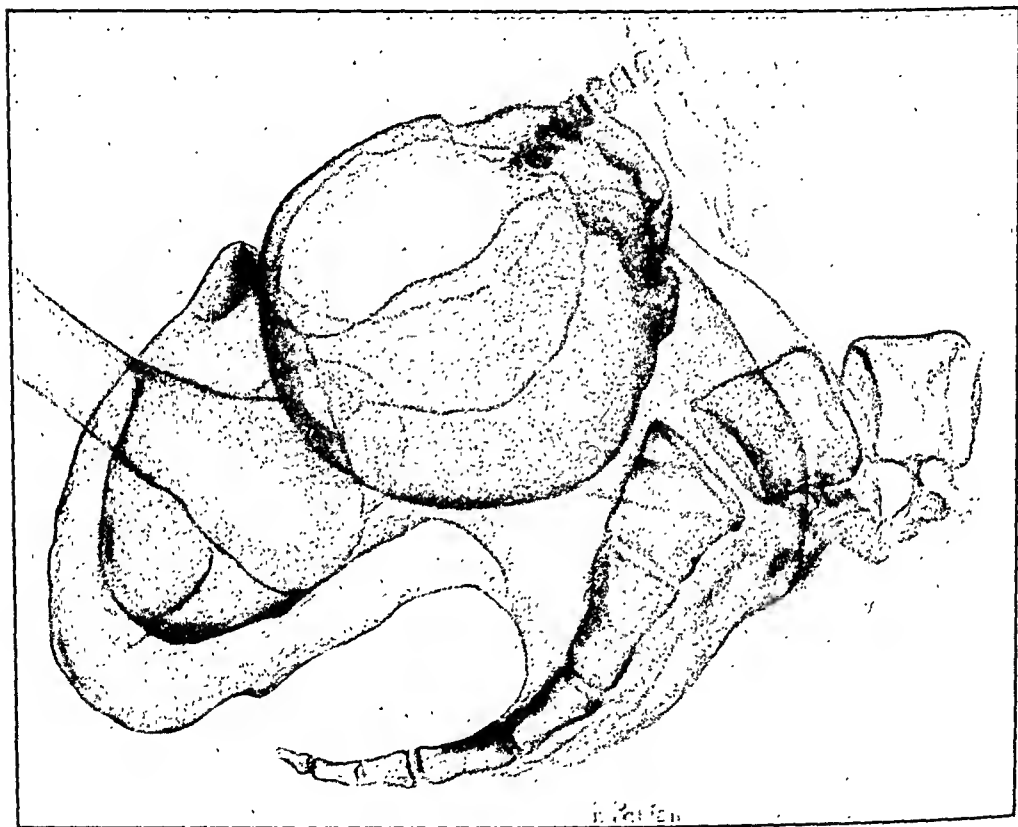


Fig. 4.—First step in process of engagement in pelvis with faulty inclination. Anterior parietal eminence protruded in front of promontory, while posterior parietal eminence is situated below sacral promontory. Longitudinal suture lies in the transverse diameter.

slow cervical dilatation. The sacrum usually flares backward, while the ischial bones flare outward, producing a wide arch. After passing through the brim labor progresses more rapidly, and by the natural mechanism. Any interference with lateral flexion, such as a posterior shoulder arrested above the promontory, a short neck, or in some cases of cord around the neck, may prevent engagement. Where the shoulders are directed toward one of the oblique diameters, there is rotation of the head through its vertical axis in addition to the movement of lateral flexion. Because of the tendency for engagement in the transverse diameter and

the patient of her immediate symptoms but that it must not run counter to her general psychologic reactions or induce a conflict with her environment.

We must always keep the fact in mind that no two patients can be treated in exactly the same way. It is in accordance with this concept that the Gynecological Service at Lebanon Hospital has been conducted during the last twenty-five years. Dogmatism, methodism, and standardization of treatment have been contrary to our conception of the management of the gynecologic patient. We are ever ready to adopt or reject procedures which have proved worthy or unworthy. Our task is to interpret clinical signs and symptoms as they manifest themselves, treat them in order of their importance and accomplish a cure for those complaints which are most troublesome and annoying to the patient. Our axiom is first to cure the cardinal disturbance and then, if possible or feasible, correct the secondary derangements in a way that is least dangerous to the patient and in a manner that will least upset her economic equilibrium.

This study is based upon an analysis of 2,175 cases of uterine bleeding in which the patients have been admitted to the Gynecological Service of Lebanon Hospital during the last twelve years.

The patients have been divided into two general categories: (1) Bleeding caused by a derangement of the pregnant state, 1,167 cases. (2) Bleeding due to pathologic changes in the genital organs, 1,008 cases.

Recent attempts to unravel the intricate mechanism of interglandular activity with particular reference to menstruation and its disorders have focused the attention of gynecologists on the functional disorders of the genital organs. It is now fairly well established that the disorders of menstruation in particular and uterine bleeding in general may not have their origin in the genital tract, but are often induced by an endocrine disturbance. This interpretation of endocrinologic function leads to a better understanding of the management of uterine bleeding. Radical procedures have given way to more conservative methods of treatment. Surgery has been relegated to those pathologic conditions which do not lend themselves to more simple methods of treatment. Hysterectomies are less frequently performed for the cure of uterine bleeding.

The gynecologist investigates the cause of uterine bleeding from a medicosurgical standpoint, and it is only after the medical aspect of the patient is thoroughly clarified that surgical intervention is given serious consideration.

The etiologic factors, either partly or wholly responsible for uterine bleeding, may be classified on a purely clinical basis into five general divisions: (1) Inflammatory, (2) local circulatory embarrassment, (3) neoplasms, (4) functional disturbances induced by endocrine imbalance and local degenerative changes in the uterus, and (5) premenopausal bleeding.

the forward protrusion of the anterior parietal bone these cases are at times improperly classified as flat pelves, when in reality the condition may accompany any type pelvis. That many cases of "transverse arrest at the brim" are merely evidence of faulty inclination, may now be appreciated.

There are various practical ways of observing pelvic inclination for ready utilization.

1. A lateral view of the patient as she stands, will make evident an unusual lumbosacral angle or lumbar lordosis. Cases of this type usually present faulty inclination. The protruding lumbar vertebrae may obstruct the entrance of the presenting part into the brim.

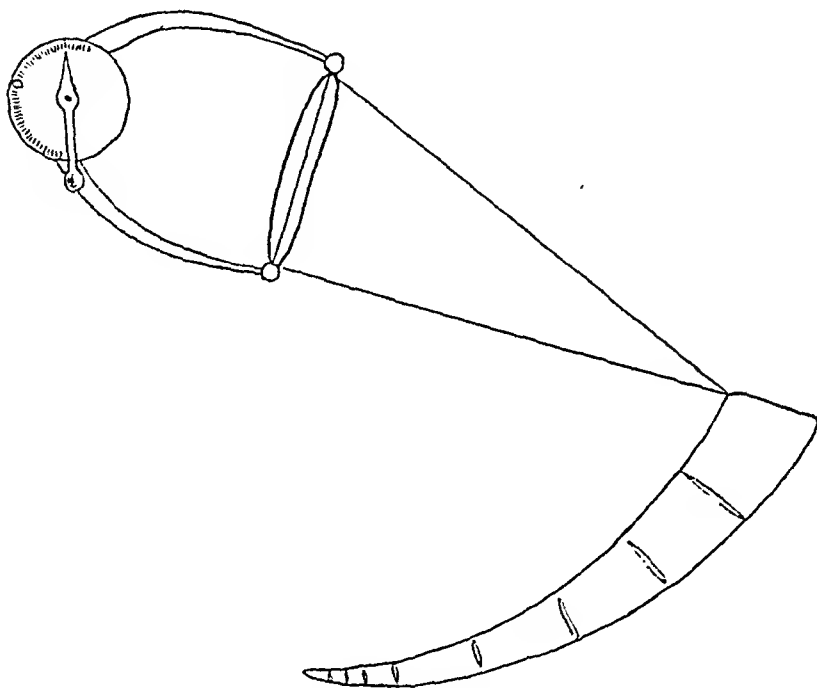


Fig. 7.—Measuring height and inclination of symphysis with obstetric inclinometer.

2. With the patient standing in the same position, place an index finger on the upper border of the symphysis and the other at the bottom of the spine of the last lumbar vertebra. Note the difference in station of the two fingers.

3. When measuring the external conjugate diameter, note the inclination or angulation of the pelvimeter.

4. Examine every patient as early as the eighth month of pregnancy and if the head is not engaged, try to push it into the inlet. If the inlet does not seem "available" and there is overriding because of faulty inclination, flex the thighs on the abdomen while attempting engagement.

5. The use of the inclinometer as previously mentioned.

6. The inclination of the plane of the symphysis is easily estimated by placing one finger on the upper and one on the lower border. A pelvimeter may be used in the same way. The inclination of the plane included between the fingers or ends of the pelvimeter is noted. For accurate and ready reading, the caliper of the inclinometer (Fig. 7) may be used.

7. The lateral pelvic roentgenogram, the merits of which Jacobs⁵ has emphasized, is again discussed for two reasons: First, because of a modification in the technic

1. *Bleeding Caused by Inflammatory Processes of the Genital Organs.*—This requires little discussion, though there are two definite schools of thought in connection with this problem; the purely gynecologic approach which means delaying of the operation as long as feasible, and the surgical approach which views infection in the pelvic organs in the same light as infection in the abdomen.

Ordinarily the removal of the offending organ is the ideal method of treatment no matter where it is located. But in dealing with the genital organs there are many important considerations which must be given serious thought before radical procedures are instituted. The question of reproduction is usually of serious import to the woman; the premature cessation of the menstrual function in the average woman is not desirable.

Unfortunately infection of the genital organs, both acute and chronic, often occurs during the most important part of the childbearing period—the third or fourth decade of life. Most frequently it is caused by gonorrhea or postabortal complications. These patients, suffering either from primary or secondary sterility, want to have a child, in most cases, and in nearly all cases to have the menstrual function continue. To operate or not to operate in this group of cases is a very difficult problem and one which often baffles even the most experienced gynecologist.

Even if the symptoms are annoying or troublesome, a temporary delay of operation is very often desirable in women who are likely to become maladjusted because they have no children or because they cease menstruating. Such women are less likely to be perturbed by the fact that they have no children when they reach the fourth decade of life. Surely this is true of menstruation; the younger the woman the greater is the possibility that she will be affected by an artificial menopause.

That the conservative management of an infectious process of the genital organs frequently has a favorable termination is illustrated by the following extreme case.

CASE 1.—A patient, twenty-two years of age, married two years, consulted one of us (A. J. R.) for sterility. Vaginal examination disclosed a bilateral pyosalpinx, possibly of gonorrheal origin. The tubes were enlarged, easily mapped out and adherent to the adjacent structures. Operation had been advised by several gynecologists. She refused because, as she put it tersely, “I have plenty of time to be unsexed.” Twelve years later she was seen again because she had missed two of her menstrual periods. Upon examination she was found pregnant. She gave birth to a normal child and subsequently to two more children.

2. *Bleeding Due to Local Circulatory Embarrassment.*—In this group of patients, menorrhagia is the usual type of bleeding in 75 per cent of the cases. The chronic congestion causes circulatory changes in the endometrium, and not infrequently a hyperplastic endometritis will develop. This is probably the cause of the prolonged menstrual flow. When the bleeding is prolonged or profuse, the displacement needs to be corrected. The type of operation to be performed will depend on

the legs completely flexed, or assuming a squatting posture, also favors engagement. At the height of several pains the legs may be flexed on the abdomen while the obstetrician pushes the overriding head in the direction of the sacral promontory in an effort to cause engagement by favoring lateral flexion. Or, with the patient in the same position pressure may be made downward as by Leopold's fourth maneuver. The Walcher position is of no value in these cases because it exaggerates the condition by producing a more unfavorable inclination. If, after a fair test of labor, the head seems incapable of the necessary lateral flexion and engagement fails to occur, as manifested by lateral roentgenograms taken during the course of labor, a cesarean section should be done, for delivery from below would be dangerous to the mother and child. In the event that the patient is not seen until late in labor

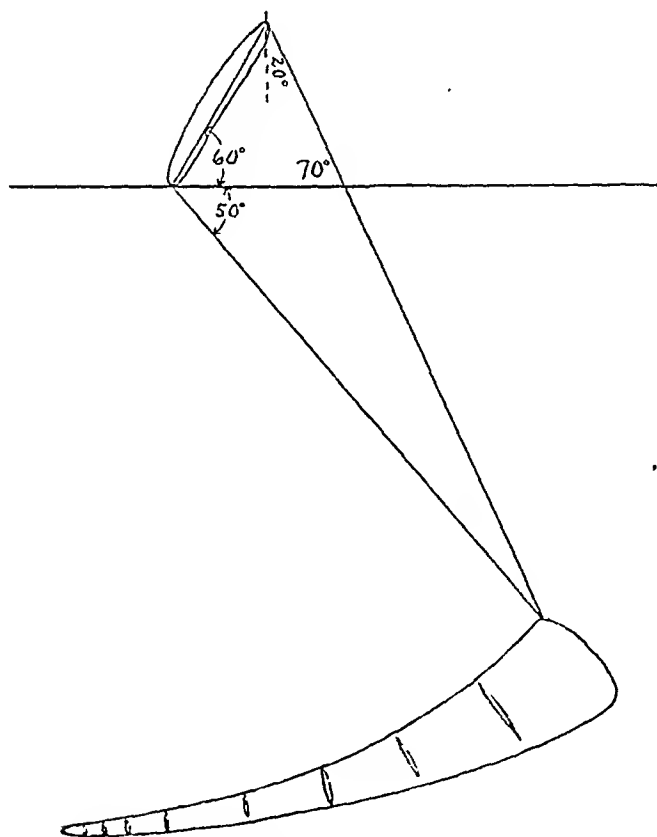


Fig. 9.—The inlet is almost perpendicular to the forces of expulsion, facilitating engagement. This is an abnormally favorable inclination.

and delivery with forceps attempted, a cephalic application must be made, and traction should be directly downward. Should version and extraction be the method attempted, the head must come through the inlet in the transverse diameter, and backward pressure applied on the anterior parietal bone to effect engagement as described for the treatment of vertex cases (Fig. 8).

CASE REPORTS

The pelvis of marked abnormal inclination is not common, yet we have encountered several where such knowledge proved of great benefit. Three good examples are here referred to, although several more have been seen. It is expected that they will be detected readily and frequently in

chosen a method of treatment that was not entirely in harmony with the accepted standards of treatment for tumors of the uterus. Hence a number of patients who had fibroids of about the size of a four or five months' pregnancy were not subjected to hysterectomy but were treated in a more conservative manner.

TABLE II. MODE OF THERAPY

OPERATION	BLEEDING FIBROMYOMA UTERI	NUMBER DEATHS	FIBROSIS UTERI	NUMBER DEATHS	TOTAL
Dilatation and curettage	63	0	51	0	280
D & C, radium	117*	2 (1.7%)	163*	0	
Laparomyomectomy	16	0			
Vaginomyomectomy	10	0			
Partial hysterectomy	3	0	1	0	
Vaginal hysterectomy	4	0	0		
Total hysterectomy	12	1 (8.3%)	1	0	
Supravaginal hysterectomy	296	8 (2.7%)	22	1 (4.5%)	
Total	521	11 (2.1%)	238	1 (0.4%)	

*Includes additional Private Cases in 1934 and 1935.

Usually we performed a curettage and inserted radium high up in the uterus. We are certain that a number of these women would not have withstood an extensive surgical operation. However, patients in whom the fibroids extended into the abdominal cavity were, as a rule, subjected to hysterectomy, especially when they complained of pressure symptoms. Supravaginal hysterectomy was the operation of choice. The incidence of malignancy in the cervical stump is not of sufficient importance to be given serious consideration. For some unknown reason cancer of the cervix is less frequent among Jewish women. The cervical stump is thoroughly cauterized before it is peritonized; that cures the endocervicitis and the leucorrheal discharge. It may also help to prevent the occurrence of malignancy since the cervical mucosa is entirely destroyed. Whether to remove the ovaries when an hysterectomy is performed is still a debatable question. Until recently it had been our practice not to remove the ovaries in patients under forty-five years of age. However, more recently, one of us (Tamis) has clearly demonstrated that there is no quantitative relationship between the amount of ovarian tissue conserved and the severity of menopausal symptoms. In fact, it is questionable whether estrin, even in large doses, is a specific for the relief of menopausal disturbances. Some of the patients who were suffering from severe flushes and sweating were found to excrete more than the normal amount of estrin. Therefore we remove the ovaries with the uterus. We have observed the patients carefully and are convinced that the absence of the ovaries does not intensify the menopausal symptoms. Often the removal of the ovaries prevents immediate and remote postoperative complications, for frequently an inflammatory reaction takes place in the tubes and ovaries, forming a cystic mass. This becomes closely adherent to the cervical stump and causes a great deal

1. The most favorable inclination noted was seventy degrees in the recumbent posture and twenty degrees in the standing posture. In either position early engagement can readily occur (Fig. 9).

2. The most unfavorable inclination was found in a primipara who had had infantile paralysis in childhood. The inclination of her inlet in the recumbent posture was seven degrees. In other words, the plane of the inlet was almost continuous with the spinal column. Although she had a bad inclination and pelvic contraction, her legs were flexed sharply on the abdomen and a six pound, seven ounce baby was delivered normally after a short labor (Fig. 10).

3. This case demonstrates the value of an accurate lateral pelvic roentgenogram (Fig. 11). Lateral flexion to effect engagement failed to occur after test of labor, and cesarean section was done.

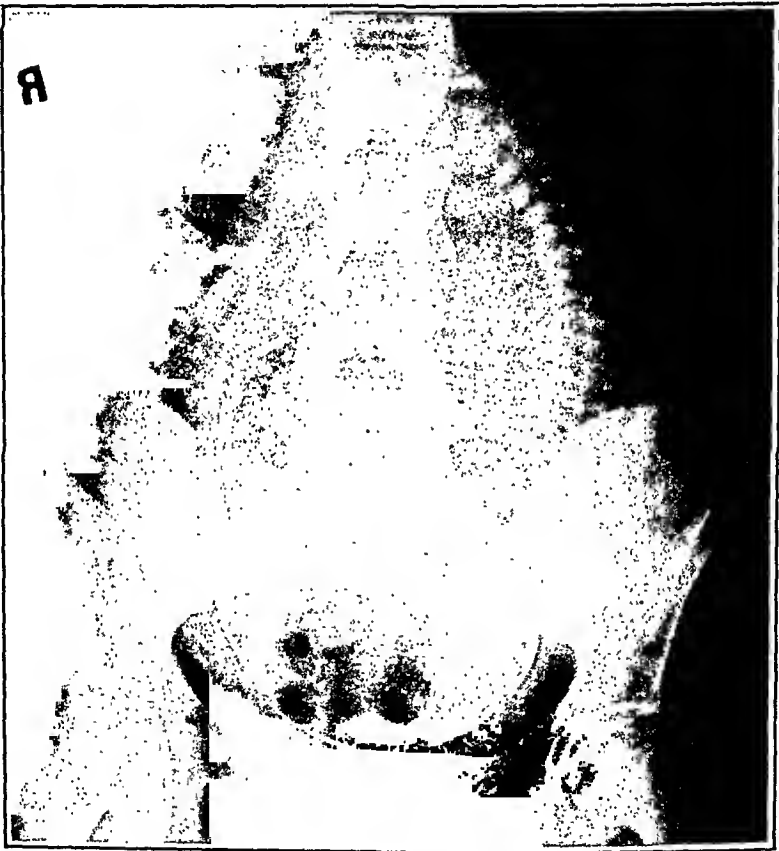


Fig. 12.—Same case as Fig. 11. Flat plate picture misleading. What appeared to offer a favorable prognosis for normal delivery required cesarean section.

The fallacy of an ordinary flat-plate picture taken of this case in determining engagement by obscuring a marked faulty inclination is clearly shown in Fig. 12.

SUMMARY

1. The habitual inclination of the pelvis as well as that of the inlet in recumbent posture has been determined in a series of living women for the first time. These figures are not in accord with those generally accepted.

2. The importance of the obstetric angle is emphasized.

4. *Functional Bleeding*.—There were 220 cases admitted during this period, in which no gross pathologic lesion could be discovered to account for the bleeding. For want of a better scientific term these cases have been grouped under the heading of “fibrosis uteri.” We are fully aware of the inadequacy of such a clinical term. While it may present a clinical entity, it lacks a definite pathologic conception of the degenerative processes involved. Some pathologists even recommend the elimination of the term “fibrosis uteri” from medical nomenclature, because of the confusion it has created in connection with its clinical interpretation. However, there seems to be a general understanding among gynecologists of what the term implies clinically. It is the large, hard, leathery uterus most often found in women approaching menopause, causing menorrhagia and metrorrhagia.

Before the introduction of irradiation therapy these patients were subjected to curettage, and in the event that failed, a hysterectomy was performed. A better understanding of the therapeutic value of radium, however, has practically eliminated the necessity for the surgical removal of the uterus in this group of cases. During the past eight years we have seldom performed an hysterectomy for bleeding in patients suffering from “fibrosis uteri.” Those patients were treated by curettage and insertion of radium high up in the uterine cavity.

5. *Premenopausal Bleeding*.—Irregular bleeding frequently occurs prior to the onset of menopause. Normally there is a lengthening of the menstrual interval and a decrease in the menstrual flow at this time. Not infrequently the opposite takes place. Theoretically this is supposed to be due to a disturbance in the hormonal control of the endometrium, brought about by an exaggeration of the anterior pituitary gonadal function. A urinalysis at this time will reveal consistently the presence of prolan. This increased prolan secretion may be interpreted as a compensatory effort to overcome the lessened ovarian activity. Perhaps this explains the occasional reappearance of the menstrual cycle in women who have already passed the menopause. The endometrial biopses fail to reveal uniformity of the pathologic processes. Lesions varying from stroma fibrosis to marked endometrial hyperplasia are observed. Recently we (Tamis) attempted to correlate the clinical history with the pathologic findings. We were forced to abandon it because of the great discrepancies found. Only when there is definite microscopic evidence of cystic glandular hyperplasia of the endometrium is it possible to interpret the bleeding as due to cystic degeneration of the ovaries. Theoretically the bleeding in these cases should be controlled by the administration of pregnancy urine extracts. Clinically it seldom proves efficacious. X-ray or radium is a much simpler method of treatment and the results are more certain.

The interior of the uterus should always be explored first. Otherwise malignancy of the body of the uterus may be overlooked. We have had

anticipate what will happen in that patient's labor. Perhaps that is asking too much from his present series of cases, because, quite obviously, it will require a large series before one can make predictions.

DR. A. J. RONGY, NEW YORK, N. Y.—A wrong pelvic inclination may influence the course of labor, but that does not quite explain the underlying principles associated with the various degrees of dystocia. Labor to start normally, and for the head to progress through the pelvic basin, depends first upon how the pivotal points of the passenger and the passage come into contact. The propelling forces exert pressure upon the fetus through a definite axis, and when that axis is not dislodged labor will progress normally. The normal axis is maintained when normal points of contact are established between the fetus and the pelvic basin. The point of contact in the fetus is the highest point of the occipital bone. The point of contact in the pelvis is on the highest point of the posterior surface of the pubic arch. These two points of contact must have a definite relationship before labor can start normally.

The mechanics of labor must be conceived as a head passing through the pelvis in a corkscrew manner, not as heretofore interpreted, as a head in changing positions, such as flexion, rotation, and extension. The position the head assumes in the pelvis is forced by virtue of this corkscrew process.

From a clinical standpoint the course of labor will depend upon the position of the fetal neck in its relation to the pubic arch. The further the fetal neck is removed from the pubic arch the greater will be the dystocia. This is why a head in the mentoposterior position cannot deliver itself spontaneously, nor can it be delivered by forceps. The reason that a head in the mento-anterior position may deliver itself spontaneously is that the farther the head progresses in the pelvis, the nearer the fetal neck approximates the pubic arch.

It is this conception of the mechanics of labor that helps us to predict whether labor is going to be normal or abnormal. In the average patient it is not the size of the fetal head nor the measurement of the pelvis that is important, but it is the manner in which labor begins and how closely the fetal neck and the pubic arch are approximated, because upon this depends whether the larger part of the fetal head will become engaged in the pelvis during any stage of labor.

DR. J. BAY JACOBS, WASHINGTON, D. C.—Dr. Garnett's purpose of presenting this paper was, of course, to emphasize the importance of the practical application of the study of inclination. For many years I have been very much interested in this subject and have devised the obstetric inclinometer for the purpose. My study of 80 cases, referred to in this paper, enabled me to determine the average inclination of the pelvis in living women. This I have found to be 42 degrees in recumbent posture, instead of the 30 degrees quoted by Cragin.

Dr. Garnett has tried to determine whether or not pelvic inclination affected delivery in any manner. He does not, however, try to create the impression that if the pelvic inclination be known, one may predict just how the patient will deliver. One should be able to detect pelvic inclination readily in the average case. For instance, should the patient stand alongside of you, notice whether there is any lumbar lordosis. If so, you immediately suspect that the symphysis is below its normal level and that the inlet approaches the line of the spinal column. This would necessitate the head's taking a right angle turn to enter the pelvis. On the other hand, should the inlet be rather perpendicular to the spinal column, whether the patient be standing or lying down, engagement is readily effected.

Dr. Garnett does not convey the idea that every patient with a faulty inclination should have a cesarean section. For example, I have recently delivered the case referred to in Dr. Garnett's paper, of the woman who had had infantile paralysis, and who had the most abnormal type of pelvic inclination. To determine the effect of postural application during labor, her thighs were acutely flexed upon the abdomen, the head readily engaged and spontaneous delivery resulted. On the other

four cases of uterine bleeding in whom malignancy of the body of the uterus was established only after pathologic examination of the endometrial tissue was made. This should serve as a warning to overenthusiastic endocrinologists who treat premenopausal and postmenopausal bleeding with glandular extracts, without first investigating the interior of the uterus. We have had two cases of granulosal tumors of the ovary

TABLE V. ANALYSIS OF DEATHS

CASE	AGE	OPERATION	CAUSE OF DEATH
<i>Fibromyoma Uteri</i>			
73473	41	D + C, Radium	Pulmonary embolus 9 days P.O. Followed by generalized gas-producing infection. Death 14 days P.O.
78632	52	D + C, Radium	Necrosis of pedunculated submucous fibroid (overlooked). Secondary infection, peritonitis. Death 5 days P.O.
47136	40	S-V. Hyst., Lt. S.O.	Generalized peritonitis. Death 2 days P.O.
52370	40	S-V. Hysterectomy	Accidental injury to bowel adherent to uterus. Generalized peritonitis. Death 8 days P.O.
55199	40	S-V. Hyst., Bil. S.O.	Cardiac failure. Death 4 days P.O.
57012	38	S-V. Hyst., Bil. S.O.	Excess P.O. vaginal bleeding. Death 25 days P.O. Autopsy, broad ligament hematoma.
59331	32	S-V. Hyst., Rt. S.O.	P.O. adhesions. Intestinal obstruction. Enterostomy. Death 13 days P.O.
66104	37	S-V. Hyst., Bil. S.O.	Cardiac failure. Death 4 days P.O.
73145	37	S-V. Hyst., Rt. S.O.	P.O. vaginal hemorrhage. Shock. Death 2 days P.O.
74257	47	S-V. Hysterectomy	Perforation of bladder. Peritonitis. Death 2 days P.O.
74809	43	Total Hyst., Bil. S.O.	Acute adynamic ileus (autopsy). Death 7 days P.O.
<i>Fibrosis Uteri</i>			
64383	48	S-V. Hyst., Bil. S.O., Append.	Cardiac failure. Death 4 days P.O.

which gave clinical bleeding after the menopause. The endometrium in both patients showed marked "Swiss-cheese" hyperplasia, indicative of the extreme degree of estrogenic activity possessed by these tumors.

We prefer to use a small dose of radium over a longer period of time. We use 25 c.m.h. for sixty to seventy-two hours instead of 50 c.m.h. for twenty-five to thirty hours. Both leucorrhea and pain in the abdomen are less likely to take place following use of radium in less concentrated form.

RADIUM AND PLASTIC OPERATIONS ON THE VAGINAL VAULT

There are many patients suffering from fibrosis uteri who bleed profusely and at the same time require repair of the vaginal vault. These patients in the past usually were subjected to vaginal hysterectomy. The

OCCIPITOPOSTERIOR POSITIONS*

S. A. COSGROVE, M.D., F.A.C.S., JERSEY CITY, N. J.

(From the Margaret Hague Maternity Hospital)

A VERY cursory examination of the American literature alone, for the past three years, shows many contributions on this subject, and the frequency with which it occurs attests to the very real problem it constantly presents to the obstetric practitioner. The same fact connotes a fundamental misconception. Some writers seem to believe that this abnormality constitutes a complete entity and is a dystocia in itself, beyond which they need not go in estimating the particular situations in which it appears. They consider only the effect and lose the significance of the cause.

A brief review of the mechanism of normal labor and of the etiology of these positions, and the fact of their frequent spontaneous evolution, show the fallacy of thinking of the condition in terms of a well-rounded, distinct entity, apart from other factors of dystocia and will perhaps bear very materially and helpfully on the management and treatment of this troublesome difficulty.

In whatever relation the occiput enters the inlet, internal rotation, swinging of the occiput to a directly anterior position from an obliquely anterior, a transverse or an obliquely posterior position, does not take place at the plane of the inlet, but is delayed until the head descends through the pelvis, and is in relation to the bony outlet thereof. Many times it occurs only after the head has presented in the vulva, and has distended the introitus of the vagina. This occurrence of internal rotation late in the succession of phenomena constituting the mechanism of labor must be remembered with reference to the management of posterior positions.

An attempt to correlate statistics of the incidence of posterior positions is hopeless. The average as exhibited in the German literature is as low as 1 to 1½ per cent, while American statistics run from 11.68 per cent to 30 per cent, with the average probably about 20 per cent. In 15,000 consecutive cases at the Margaret Hague Maternity Hospital the incidence was only 5.1 per cent. It, of course, is realized that this is far below the *primary* incidence for, as Williams points out in relation to his service, many of our admissions are received too late to note the primary position. Besides, our routine use of rectal examination in labor further militates against accuracy of diagnosis of primary relationship.

*Thesis for admission presented at the Forty-Eighth Annual Meeting of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons held at Skytop, Pa., September 16 to 18, 1935.

POSTIRRADIATION LEUCORRHEA

A small number of patients develop a severe vaginal discharge after the use of radium. The discharge at first is thick and greenish in appearance; later it becomes watery. It is annoying and troublesome to the patient, often irritating the vagina, cervix, and even the vulva. Being constantly bathed by the discharge these parts become highly congested, causing undue smarting of the surfaces and even pain. Curiously enough, patients who develop leucorrhea seldom complain of pain in the abdomen. We have never been able to explain this clinical phenomenon. The discharge most likely is due to a burn of the uterine surface which takes a long time to heal. This was recently illustrated in a case of uterine bleeding in which radium was used. The pathologic report of the uterine scrapings proved to be carcinoma of the body of the uterus. Four weeks later a panhysterectomy was performed. A radium burn of the mucous surface, about the size of a half dollar, was found on the anterior wall of the uterus. Curiously enough, careful sectioning of the uterus disclosed no traces of malignancy in the endometrium. The pathologic examinations were made by the same pathologist. The healing process of the uterine wound is delayed, for notwithstanding the fact that gravitation favors uterine drainage, the internal os is too small to permit the complete escape of the mucopurulent discharge produced by the granulating surface.

VESICAL IRRITABILITY

We have not encountered much postirradiation vesical disturbance in this series of cases. Some patients complained of more frequent micturition. Many of these patients suffer from vesical tenesmus prior to the operation; therefore, the bladder disturbance which follows the operation cannot be correctly evaluated. Many of the bladder symptoms can be obviated if the radius is introduced high into the pelvic cavity, away from the bladder.

An analysis and study of 1,048 cases of uterine bleeding leads us to the following conclusions:

1. Hysterectomy should be performed only in those patients who have no local or constitutional contraindications for the operation.

2. Patients who have definite metabolic disturbances and are overweight or who manifest cardiovascular derangements, should not be subjected to a hysterectomy even if the uterus is larger than three months' pregnancy. The risk of an operation is too great in such group of patients. Curettage and the insertion of radium will stop the bleeding.

3. Patients whose hemoglobin index is low, 50 per cent or less, should have the bleeding temporarily controlled by curettage and irradiation, a major surgical procedure should be deferred and performed only when the patient has sufficiently recuperated from the loss of blood.

through a normal or not too badly distorted outlet. Clinical experience proves that this expectation is valid, because as already shown, the great majority of cases are capable of spontaneous delivery.

By logical extension of this conception, if spontaneous rotation does not occur and the vicious position is persistent, the failure to rotate must depend on more definite asymmetry or disproportion than that which has determined primary malposition in those cases which rotate spontaneously.

Again clinical experience bears this out as developed earlier in the paper. I believe, therefore, that the occipitoposterior position is not necessarily and per se, a definite pathologic entity. If it becomes pathologic by reason of its persistence, that pathology is constituted not only of the vicious position but most important, of some degree of pelvic anomaly or cephalopelvic disproportion which coexists therewith. The problem of management must be predicated upon the existence and nature of this bony pelvic dystocia, rather than primarily upon the vicious position caused thereby.

It therefore follows that the most important phase of the management consists in competent antenatal estimation of the pelvis by careful thorough examination of pelvic types and proportions in relation to the size of the fetus. This estimation of pelvic adequacy should take account not only of the inlet, but of the midpelvis and outlet, for deviations from the normal in all of these planes may contribute to difficulty. Roentgenology should be increasingly utilized in making these estimates. The value of the contributions of Thoms and many others to the roentgenologic study of the pelvis should be acknowledged; the work of Caldwell and Moloy in defining factors of abnormality, and the clinical details aiding in their recognition, and their effort to place their roentgenologic identity on a plane of direct quantitative accuracy, have been most stimulating and salutary. Wider use of the advantages offered by the advanced work of many observers will materially enhance general results. In our own clinic definitive effort is made to critically estimate every pelvis before the patient goes into labor.

If such estimation shows an approximately normal pelvis and an approximately normal child, little disquiet need be caused by the occurrence of posterior positions of the head at the inlet, because prognosis for spontaneous rotation is good.

If, however, the pelvis is recognized as so abnormal as to make the prognosis for normal delivery dubious, then the occurrence of an occipitoposterior position must be recognized as contributing an additional factor of dystocia, and increasing the hazards for mother and child.

The vicious position itself may generally be recognized by abdominal palpation before the onset of labor and attempt to correct it made. Postural treatment has been suggested as useful, and Watson is en-

in this series of cases clearly indicates how diversified and selective we have been in our methods of treatment.

DISCUSSION

DR. FREDERICK H. FALLS, CHICAGO, ILL.—We will agree that we should be very conservative about the treatment of uterine bleeding where the cause of the bleeding is inflammatory, since by conservative treatment we find that as the inflammatory process improves, the bleeding stops.

As far as the circulatory embarrassment due to malposition is concerned, one rarely has to do anything radical. We feel that only occasionally is a suspension of the uterus necessary for a retroversion that is causing bleeding. Frequently holding the uterus in position for a time with a pessary will so improve the ovarian circulation that the bleeding will stop. Many of these bleedings are due to circulatory changes in the ovary rather than in the uterus. I believe it is a hormone reaction, producing hyperplastic changes in the endometrium.

We would hardly want to say that malignancy after supracervical hysterectomy is negligible. On the other hand, we do not believe that because this may occur it is necessary to do a total hysterectomy in all cases. For this reason in all cases of fibroids in our clinic we do a cautery of the cervical stump as a preliminary to the hysterectomy, and when there is a positive Schiller test we do a biopsy to be sure that we have not an early concomitant carcinoma. In that case we would do a total hysterectomy.

We feel that radium should be used only in fibroid cases that have not advanced to a size larger than a three months' pregnancy. In certain cases of large fibroids where there has been extreme exsanguination we feel that curettage and a small dose of radium may stop the bleeding temporarily. Then we can transfuse the patient and operate, or if we wait four, five, or six weeks she is in better condition for the necessary hysterectomy.

We agree on the question of myomectomy in women who are bleeding and are in the childbearing age and are anxious to have a baby. If the myomectomy is done and the woman becomes pregnant, especially if she is elderly, a cesarean section should frequently be done in the interest of the baby.

As to the fibrous uteri, I think we all agree that a small dose of radium is probably the best form of treatment. In all cases, however, one should be very careful to look for malignancy, not only by curettage but by very careful biopsy. We have recently adopted the rule of doing a Sturmdorf operation in doubtful cases, and making multiple sections from the cone removed to detect an early carcinoma.

DR. PAUL TITUS, PITTSBURGH, PA.—This paper of Dr. Rongy's is not exactly the type of paper that lends itself readily to discussion because it is so general in its scope. It seems to me that it is more a study that will be used later for reference because of its general nature and perhaps because it is to a certain extent a statistical survey. Probably it is on this account that Dr. Rongy made no particular effort to summarize his findings, and that is a suggestive criticism that I should like to make of this paper if Dr. Rongy would permit.

He stated first that there are two general types of bleeding, those associated with pregnancy, and those not so associated. Of the latter we have to deal with those occurring during and after the childbearing age. In the first of these the cause of the bleeding often causes sterility, and when correcting the cause of the bleeding, efforts should be made to conserve the childbearing function. These very briefly were the outstanding points that seemed worthy of particular emphasis.

DR. HENRY SCHMITZ, CHICAGO, ILL.—It is unfortunate that usually papers on uterine bleeding are published in the special journals instead of in journals

positions, and find it to average, even in primiparas, not much more than two and one-half hours. They say that more frequent reiteration of the fact that some prolongation of labor is naturally to be expected in these positions might well increase our equanimity in managing them. Certainly such average prolongation as they demonstrate hardly warrants the necessity for universal operative interference. I would like to reiterate that where labor is unduly prolonged, the prolongation depends not on the posterior position, but on the definite bony dystocia which must, in these cases, coexist in a causative relation to the malposition. Williams says that many American writers, "being led astray by their fears, have failed to realize what nature can accomplish," whereas he himself regards posterior positions with equanimity provided the pelvis and child are normal in size. He therefore does not believe in interference except where forceps are necessary for other indications. De Lee also stresses the frequency of spontaneous anterior rotation, and says that watchful expectancy is the treatment until an indication for interference arises. Vaux reserves interference until the head is well engaged or descended into the pelvic cavity, and for at least two hours after completion of the first stage. Our own practice is eminently conservative. Results in 366 persistent posterior positions out of 4,810 private cases quoted give no maternal deaths and a gross fetal and neonatal mortality of 5.2 per cent. In 499 persistent posteriors out of 15,000 public cases there were no maternal deaths and 6.2 per cent newborn and neonatal mortality.

Correction of these totals by deduction of 15 premature fetuses of less than twenty-eight weeks, of 2 cases of spontaneous abruption of the placenta, of 5 fetuses dead before labor and macerated at birth, of 10 babies manhandled before admission, so that 3 were severely traumatized and 7 were killed, gives 2.7 per cent in the private series and 2 per cent in the public. These compare favorably with the 3.1 per cent corrected fetal mortality from the general service of Bill's own institution, handled not so radically as he does his own, but with a general tendency toward the early interference which he favors.

One other principle of first stage management which is most important is the relief of pain. It is indicated by every consideration of humanity and good practice. It conserves the strength and well-being of the mother as nothing else does, and, if used judiciously, does not injure the baby. The use of agents for this purpose should be commenced early. Bill appropriately states that the indication for their use should be subjective and not objective. I wish that there might be emblazoned on the walls of every delivery room, and impressed deeply in the consciousness of every student and practitioner Bill's words: "A certain amount of dilatation of the os is not deemed essential as an index of the time to

I understood Dr. Rongy to say that he routinely employs radium after the removal of cervical polyps. The vast majority of cervical polyps, however, are small and obviously benign, and if there is any doubt at all, this can be settled by microscopic examination, so that there would seem to be no reason for the routine use of radium in such cases. In cases of myoma, one should remember that the existence of such a tumor does not necessarily mean that it is the cause of the patient's bleeding. If the uterus is curetted, or if the uterus is opened up immediately after removal, as it should be, one may occasionally get a surprise by finding an unsuspected adenocarcinoma of the corpus associated with the myoma.

DR. DAVID W. TOVEY, NEW YORK, N. Y.—I think the ovaries should always be saved if one has not, after removing the fibroid, interfered too much with the circulation. If the circulation has been disturbed, it will be necessary to sacrifice them.

In regard to supravaginal hysterectomy, with cantery destruction of the mucosa, operation from above does not always get the carcinoma, since it is in the vaginal portion of the cervix. There is no doubt that more vaginal hysterectomies should be done as you get the whole uterus, and it can be done under local anesthesia very easily.

DR. RONGY (closing).—The incidence of carcinoma in the cervical stump is not a great problem to us, for it is a fairly well-established fact that the occurrence of cervical carcinoma in Jewish women is very much less than in any of the other groups. We cauterize the cervical stump after supravaginal hysterectomy through the abdominal wound before it is peritonized. This helps to cure the endocervicitis and the leucorrheal discharge. It may also help to diminish the incidence of carcinoma of the cervical stump, because the lining of the cervical canal is destroyed.

As to cesarean section in patients who have had myomectomies, that, of course, depends to a large degree upon the extent of the uterine scar as a result of the removal of the fibroid tumors. All patients in labor, who have had previous myomectomy, must be watched very carefully. If labor progresses tediously it is not always safe to leave these patients alone, and delivery has to be accomplished by cesarean section. Especially is this true in elderly primiparas.

I accept Dr. Titus' criticism. I did not summarize the paper for the reason that it was a general discussion of the various phases of uterine bleeding and their treatment.

We find that when patients complain of severe leucorrheal discharge following the use of radium they seldom complain of pain. The pain which occurred in many of our cases may last as long as eighteen months, and it disappears only when the uterus has undergone involution and the tumors have practically disappeared.

Regarding the use of radium in conjunction with the removal of cervical polyps, I did not have in mind those patients who suffer from cervical polyps during the childbearing period, but patients who have cervical polyps during the premenopausal period and who suffer from irregular spotting and bleeding. I think it is a good practice in that group of cases to use a small dose of radium after the polyps have been removed, in order to make sure that the menstrual function will disappear.

A great number of physicians take it for granted that irregular bleeding in the latter part of the fifth decade is quite normal, and many serious conditions of the genital tract are overlooked as a result of it. It is, therefore, advisable to think of bleeding during that period as a separate entity and possibly more attention will be given to it both by patient and physician.

I believe that on the whole vaginal hysterectomy should be performed only in those cases where sufficient relaxation of the vaginal vault is present and where the uterus is not larger than the size of a three months' pregnancy.

SUMMARY

1. The great variation in statistical estimates of both primary incidence and persistence of occipitoposterior positions is shown by selections from the literature, and by two series of cases herewith presented.
2. It is shown that both the occurrence and persistence of this condition depend on bony pelvic deformity or cephalopelvic disproportion.
3. It is this causative and concurrent *pelvic* dystocia which renders a certain proportion of occipitoposterior positions seriously pathologic.
4. Management must be predicated primarily on this associated pelvic dystocia.
5. Details of management are discussed in relation to the prenatal period, the first stage of labor, and the second stage of labor.
6. The specific value of the Kielland forceps is discussed.

REFERENCES

- (1) *Bill, Arthur H.*: AM. J. OBST. & GYNEC. 22: 615, 1931. (2) *Bidentopf*: Surg. Gynec. Obst. 59: 287, 1934. (3) *Burger, Charles* (Budapest): Surg. Gynec. Obst. 59: 236, 1934. (4) *Caldwell, W. E.*: AM. J. OBST. & GYNEC. 20: 839, 1930. (5) *Caldwell, W. E., and Moloy, H. C.*: AM. J. OBST. & GYNEC. 26: 479, 1933. (6) *Callkins, Litzenberg, and Plass*: AM. J. OBST. & GYNEC. 22: 604; Oct., 1931. (7) *Danforth, W. C.*: AM. J. OBST. & GYNEC. 23: 360, 1932. (8) *De Lee, Joseph B.*: Principles and Practices of Obstetrics, ed. 6, Philadelphia, 1933, W. B. Saunders Co. (9) *Hanson, Samuel*: Surg. Gynec. Obst. 59: 102, 1934. (10) *Mast, William H.*: AM. J. OBST. & GYNEC. 26: 74, 1933. (11) *Scott, R. A.*: AM. J. OBST. & GYNEC. 23: 400, 1932. (12) *Stude, William Carl*: Surg. Gynec. Obst. 59: 913, 1934. (13) *Thomas, Herbert*: Surg. Gynec. Obst. 56: 97, 1933. (14) *Vaux, Norris W.*: AM. J. OBST. & GYNEC. 20: 782, 1930. (15) *Williams, J. Whitridge*: Obstetrics, ed. 6, New York, 1930, D. Appleton-Century & Co.

254 UNION STREET

Te Groen, L. J.: Sterility, South African M. J. 9: 145, 1935.

In a presidential address the author lists the social problems, such as sterility, birth control, and abortions, that confront the general practitioner in his work. He feels that the medical profession must take a lead in these problems rather than abide by the narrow outlook of the law.

Investigation of the causes of sterility in the male and the female and their treatment are discussed. The semen examination in the male and the tubal patency tests in the female are described.

F. L. ADAIR AND S. A. PEARL

by erosion and ulceration, may cause a bladder fistula, while the constant pressure of foreign bodies, the most common of which is the pessary, may be the etiologic factor in a rare case.

Two types of fistulas offer great difficulties, (1) those in which there is extensive loss of tissue, and (2) those which are situated high in the vaginal vault and adherent to bone. The surgical fistulas, because of their location, are usually more difficult to close than the obstetric, and numerous techniques have had to be devised in order to reach them.

The treatment of vesicovaginal fistula is surgical. The preparation of the patient is of prime importance. The vagina, the vulva, and the inner surface of the thighs are involved in an inflammatory process resulting from the irritation of these parts by the constant dribbling of urine. Incrustations of urinary salts, in the form of phosphatic deposits, are found in these areas, and the formation of granulation tissue and ulceration are sequelae of this irritation. Urinary antiseptics in the form of methenamine and acid sodium phosphate, 5 gr. (0.300 gm.) each, should be administered four times a day and fluids should be given in large amounts. An indwelling catheter should be introduced in the bladder in the hope of directing some of the urinary flow away from the parts. The urinary deposits may be removed by means of warm, mildly acid, irrigations, a warm solution of acetic, hydrochloric or nitric acid, 1 to 1,000 answering the purpose. The irritated surfaces are then painted with a 10 per cent solution of silver nitrate, and the parts are protected by the free application of a bland ointment such as diaehylon ointment and others. Even with this regime it may take two to three weeks to get the parts in condition to operate upon them.

The silver wire suture is responsible today "for the absence of inflammation and tumefaction" just as it was in May, 1849, and can still be used to great advantage in closing vesicovaginal fistulas. The classical Sims operation is applicable to many of them; in others, the bladder may be freely mobilized, the bladder opening closed in layers with fine chromic catgut, avoiding the bladder mucosa, and the vaginal wall approximated by means of interrupted silver wire sutures. This latter technique has served me well and has been responsible for good results in extensive bladder fistulas.

Several methods of closing a vesicovaginal fistula have been devised since the publication of the original Sims technique. In the main, these methods consist of (A) the vaginal operation of which there are several varieties, and which include: (1) paring the edges and closing in one layer with silver wire, (2) mobilization of the bladder and closure of the bladder and vagina in separate layers, (3) making use of the cervix and body of the uterus to close the opening, (4) suturing pedicled flaps from the vagina and vulva to bridge over the area, (5) using the gracilis muscle as a pedicled flap (Garlock technique), (6)

and two gynecologic clinics. It is true that without the splendid cooperation received from the Chicago Lying-in, Cook County, and Sarah Morris Hospitals the maternal and fetal mortality might have been higher.

In the two-year period from July 1, 1932 to June 30, 1934, we handled 6,863 confinement cases and 167 abortions of various types in the patients' homes. In 6,537, or 95.3 per cent, of these cases the deliveries and the postpartum periods were completed in the home; the remaining 326, or 4.7 per cent, were sent to a hospital because of some complication threatening the life of the mother which could not be handled in the home. It is primarily the results obtained in these 6,537 cases followed throughout pregnancy, labor and puerperium that are included in this report. Of these cases 4,550, or 70 per cent, were white, and 1,987, or 30 per cent, were colored. There were 1,075, or 16.4 per cent, primiparas and 5,462, or 83.6 per cent, multiparas, a ratio of 1:5. The presentations diagnosed at the time of delivery are shown in Table I and are approximately the same as those cited in most standard textbooks.

TABLE I. PRESENTATIONS

	NUMBER	PERCENTAGE
Cephalic	6,327	96.7
Breech	181	2.8
Face	18	0.3
Transverse	11	0.2
Total	6,537	100.0

Regarding the method of termination, 6,278, or 96 per cent, delivered spontaneously, and 259, or 4 per cent, were completed by some operative procedure from below. This figure is not absolutely accurate inasmuch as many of the 326 patients hospitalized were delivered by some operative measure which obviously would elevate the incidence of operative deliveries.

TABLE II. TYPES OF OPERATIONS

OPERATION	NUMBER	PERCENTAGE OF OPERATIONS	PERCENTAGE OF TOTAL DELIVERIES
Forceps	191	74	3.0
Versions	26	10	0.4
Breech extractions (including forceps to after-coming heads)	30	12	0.4
Craniotomies	12	4	0.2
Total	259	100	4.0

Table II reveals a heavy preponderance of forceps operations, as one might anticipate, and a seemingly high incidence of craniotomies, which will be explained later.

Table III gives an analysis of the forceps extractions.

It will be noted that one mother died (Table III) after a midforceps operation, an incidence of 0.5 per cent. This patient died from an ether pneumonia. We now use parasacral anesthesia in most of our operative deliveries. There were ten fetal deaths, an incidence of 5.2 per cent; these deaths included stillbirths and babies dying within the first two weeks of life. It is important to mention

laceration of the cervix, fibrosis uteri, and relaxation of the perineum. A vaginal hysterectomy and perineorrhaphy were performed. On February 12, six days after operation, urinary leakage was noticed on her pad, and a definite vesicovaginal fistula developed. On April 17, 1926, the classical Sims operation was performed, the edges of the fistula were denuded, and it was closed in one layer with silver wire sutures. The fistula healed readily. The patient was examined on May 1, 1926; there was no urinary leakage and she had good bladder control.

CASE 4.—Mrs. M. R., twenty-eight years of age, was admitted as an emergency case to the Carney Hospital on Nov. 25, 1923. She had valvular heart disease in the form of pulmonary stenosis with decompensation, this diagnosis having been made by the Medical Service. She had been in labor forty-eight hours; her cervix was two fingers dilated and the vertex, presenting in R.O.P., was overriding the symphysis. Her condition was desperate. She was delivered by a low cervical cesarean section, under local anesthesia, and recovered. Her second pregnancy occurred in 1926. At the end of eight months of this pregnancy cardiac decompensation again occurred, and she entered the hospital on March 9, 1926, where she was delivered by a second low cervical cesarean section, under local anesthesia. She also recovered from this operation. She showed signs of cardiac distress early in her third gestation, which had reached seven months when she collapsed. Since the fetus was small and was thought to be dead in utero she was delivered, by a vaginal cesarean section, under spinal anesthesia, on May 23, 1927, the anterior and posterior cervical lips being incised. The bladder was very adherent and was separated with difficulty. A male fetus, showing early signs of maceration, was delivered by version and extraction. The bladder, which was injured at delivery, was repaired immediately, but a small vesicovaginal fistula soon developed. She was discharged on the forty-fourth day after operation, her long stay in the hospital being due to the cardiac condition. At this time the bladder held 8 ounces of urine and the vaginal leakage was slight. On June 12, 1928, she was operated upon for the fistula which was found near the middle line and one and one-half inches (3.75 cm.) below the urinary meatus. A lateral episiotomy was done on the right side, the anterior vaginal wall was opened longitudinally in the middle line and two lateral flaps were separated, the bladder opening was closed with interrupted sutures of No. 0 chromic catgut, the bladder mucosa being skipped, the bladder musculature was approximated over the first suture line by a continuous stitch of the same material, the anterior vaginal wall was approximated by interrupted sutures of No. 2 chromic catgut. The episiotomy was repaired with No. 2 chromic catgut and silkworm gut. At the completion of operation the vagina was filled with gauze and the bladder with a solution of methylene blue. No leakage occurred. The healing was imperfect, however, as there was recurrence of the fistula. She was advised to return to the hospital at a later date, but she disregarded this advice and was subsequently operated upon elsewhere by another surgeon, who successfully closed the fistula.

CASE 5.—Mrs. H. C., twenty-eight years of age, had a difficult forceps delivery in another city, after eighty hours of labor, resulting in a stillborn child and a large vesicovaginal fistula to the right and behind the right pubic ramus, to which it was firmly adherent. The fistula was inaccessible to the vaginal route. The first operation was performed on July 18, 1929, at the Carney Hospital and consisted of a suprapubic intravesical closure. She was discharged on the twenty-second day after operation with a small opening at the site of the original fistula. The second operation was performed on Dec. 3, 1929, the fistula being pared and closed vaginally with eight silver wire sutures. At the end of operation the bladder was filled with methylene blue solution and the vagina with gauze, there apparently being no leakage. She remained dry for ten days, after which leakage occurred. The third operation was performed on March 28, 1930, and consisted of a vaginal closure. A

the patient to restrain from any bearing down efforts, and she is placed in either a knee-chest or a Trendelenberg position to await the arrival of the resident and his assistants. Of course, a few babies are going to perish in the interim, but this is unfortunately unavoidable. In some instances where the patient's home is not too far from the Center, and she is almost completely dilated, the interne is instructed to wash off the vulva carefully, insert a sterile gloved hand into the vagina and hold the presenting part up to relieve any possible pressure on the cord. On arrival of the resident an operating room is quickly improvised and

TABLE VI. PROLAPSED CORD

OPERATION	NUMBER	PER-CENTAGE	MATERNAL MORTALITY	FETAL MORTALITY
Version and extraction	9	43.0	0	2
Forceps	3	14.0	0	1
Craniotomy	1	5.0	0	1
Spontaneous delivery	8	38.0	0	2
Total	21	100.0	0	6

the baby is delivered by an operation which will give it the least risk without jeopardizing the life of the mother. When the cord prolapses before the cervix is completely dilated or dilatable, we are in somewhat of a dilemma. In a good hospital under these circumstances one can thoroughly cleanse off the cord, replace it and insert a bag, with but slight danger of infection, but in the type of home in which we operate, this procedure would be extremely hazardous to the mother. The procedure is either a Braxton-Hicks version, if conditions permit, or otherwise to leave the case alone, hoping that the pressure will be insufficient to cause death of the fetus before the patient is completely dilated and delivery is safe.

Postpartum Hemorrhage.—A loss of 500 c.c. of blood during or immediately following the third stage of labor is classified as a postpartum hemorrhage. Because we are dealing with a transient group of young doctors, we necessarily have to overemphasize the seriousness of blood loss, with the natural consequence that our doctors will overestimate rather than underestimate the amount of blood lost. We take great pains to encourage this attitude, as it seems preferable to have the doctors become alarmed too early rather than too late. This fear or respect for blood loss inculcated in our doctors' minds probably accounts for the large number of postpartum hemorrhages in this series of cases. There were 243 cases where the interne estimated a blood loss of 500 c.c. or over, or an incidence of 3.7 per cent. Table VII shows the method of delivery in these cases, as well as the type of treatment employed.

TABLE VII. POSTPARTUM HEMORRHAGE

DELIVERY	NUMBER	PERCENTAGE	TREATMENT	NUMBER	PERCENTAGE
Spontaneous	190	78.0	Medicinal	191	78.6
Precipitate	14	5.7	Manual removal of placenta	16	6.6
Operative	39	16.3	Uterine pack	36	14.8
Total	243	100.0	Total	243	100.0

As will be noted in Table VII, medicinal or mechanical measures sufficed in 191, or 78.6 per cent, of these cases. This consisted of hypodermic injections of pituitrin, aseptic ergot or gynergin, assisted by fundal massage with expulsion of the blood clots. It was also found efficacious in certain cases to insert a hand in the lower uterine segment while the external hand sharply anteflexed

the ablation of the adnexa was performed. The vaginal vault was closed tightly, without drainage. Ten days after operation a small vesicovaginal fistula appeared in the vaginal vault. This was apparently due to a small slough following interference with the blood supply of a small area of the bladder, following its wide dissection. On June 6, 1929, she was seen in consultation with a urologist who attempted to close the fistula by a suprapubic intravesical operation. This, however, was not successful. On Oct. 29, 1929, I operated vaginally by making an incision in the vaginal wall around the fistula, dissecting two vaginal flaps, and freely mobilizing the bladder. The vesical opening was closed by a continuous suture of No. 0 chromic catgut, which skipped the mucosa. A second layer of muscularis was approximated over the first suture line by a continuous stitch of the same material. The vaginal wall was approximated over this with silver wire sutures. Healing took place by first intention and the patient has remained well since.

CASE 7.—Mrs. B. L., thirty-one years of age, had a vesicovaginal fistula extending from below the urinary meatus to the cervix, following an instrumental delivery. There had been two unsuccessful attempts at closure in another state before she was admitted to the Carney Hospital. On Oct. 24, 1930, the vaginal wall was dissected from the fistula and freely separated, thus mobilizing the bladder. The bladder rent was closed with a running stitch of No. 2 chromic catgut, skipping the mucosa, the bladder muscularis was approximated over this, as a second layer, with interrupted sutures of No. 1 chromic catgut. The vaginal wall was united with ten silver wire sutures. It was found that the lowermost stitch closed the cervical os, in coapting the edges of the denuded area. It was removed, leaving nine silver wire sutures. Healing occurred by first intention, there being no leakage whatsoever after operation. She obtained an excellent result and was discharged cured.

CASE 8.—Mrs. C. F., thirty-one years of age, had a urethrovesicovaginal fistula and a complete laceration of the perineum following a version and extraction, the child being stillborn. In May, 1932, she was operated upon in another city, an attempt being made to close her fistula. There was urinary leakage when she got out of bed and this persisted until she was admitted to the Carney Hospital, where, on June 24, 1932, she was operated upon, a classical Sims operation being performed, using five silver wire sutures. This operation was unsuccessful. On Sept. 26, 1932, she was again operated upon. A median incision was made in the anterior vaginal wall and two lateral flaps were fully dissected, exposing a small fistula in the posterior urethral wall and a large vesical fistula below it. It was then found that the last operation had failed because the urethral fistula had not been discovered at that time and that urinary leakage had occurred under the vaginal wall. The fistulas were closed separately in three layers, the first with No. 2 chromic catgut, interrupted sutures, skipping the mucosa, the second and third reefing over the bladder and urethral muscularis by means of continuous sutures of No. 0 chromic catgut. The vaginal wall was approximated with silver wire sutures, eight in number. The closure was satisfactory and healing took place without complications. On Dec. 10, 1932, her complete tear of the perineum was repaired with success. She was discharged with a healed bladder and urethra, a well-functioning anal sphincter and a good perineal body. She was examined on Oct. 13, 1934, at which time the perineum was satisfactorily restored, the vagina was dry, she had good bowel and bladder control, and felt well.

CASE 9.—Mrs. H. T., thirty-three years of age, had a vesicovaginal fistula in the upper left vault under the left pubic ramus, following an injury to the bladder which occurred elsewhere during the performance of a supravaginal hysterectomy for pelvic inflammatory disease. The cystoscopic examination showed the fistula to

tions resulting from an inadequately dilated cervix or from an extension of the arms above or behind the head.

In this series there were fourteen fetal deaths for an incidence of 7.7 per cent and this is considered a favorable result in an out-patient clinic. There were no maternal deaths.

TABLE VIII. BREECH PRESENTATIONS

DELIVERY	NUMBER	PER- CENTAGE	MATERNAL MORTAL- ITY	FETAL MORTAL- ITY
Spontaneous	80	44.2	0	3
Manual aid	71	39.2	0	5
Forceps to after-coming head	24	13.2	0	4
Extraction	6	3.4	0	2
Total	181	100.0	0	14 or 7.7%

Cesarean Section.—Although none of the cesarean sections were performed in the home, the figures are included in this report in order to demonstrate the number of sections necessary and the results which can be obtained in a general obstetric practice. The number of cases requiring sections should approximate that in a group of general practitioners with the same size practice as ours, and not the number done in the average hospital for obvious reasons. Also, we cannot compare our series with the obstetric specialist's, inasmuch as he will be more apt to receive patients who have had a previous section or will often be called in consultation by the family doctor in cases needing this type of delivery.

Cesarean section was selected as the operation of choice in 45 cases, or in one in each 152 deliveries, an incidence of 0.65 per cent. Laparotrachelotomy was performed in 31, or 68.9 per cent, of these cases. One classic section was performed on a badly exsanguinated patient with a placenta previa centralis, and the remaining 13 were Porro sections. One was done on a case of uteroplacental apoplexy in which the entire uterine musculature was infiltrated with blood, the type described by Couvelaire; several were done on multiparas near the menopause where sterilization was indicated and/or desired, and all cases were either potentially or actively infected, and it was concluded that the risk involved was not worth the price of the uterus. The results obtained were interesting. In spite of the emergency character of these cases, not one mother's life was lost, but 9 babies died, a fetal mortality rate of 20 per cent. The cause of death could be explained in 7 of these 9 patients; 2 occurred in patients with severe nephritic toxemia, both babies being mature but small and dying within a few days. Four babies' deaths were due to a complete abruptio placentae, including the one of uteroplacental apoplexy previously mentioned. One baby died from syphilis in a primipara with a recognized and treated syphilis; she was sectioned for a placenta previa centralis with severe hemorrhage. The cause of the other two deaths could not be ascertained.

Ruptured Uterus.—Rupture of the uterus occurred in three cases, or 0.04 per cent, two being unquestionably definite complete ruptures and the third a doubtful incomplete tear, the type of case frequently overlooked unless the uterus is extirpated and the lower uterine segment examined minutely. One case occurred during version and extraction in a multipara for a prolapsed cord. The patient was sent to a hospital where a blood transfusion and supravaginal hysterectomy was done immediately with recovery. The second case occurred either before or during craniotomy. In all difficult operative procedures it is our custom, immediately following the removal of the placenta, to change our gloves and under strict aseptic precautions carefully invade the uterine cavity and explore for

SUMMARY

1. A review of 10,000 consecutive, personal gynecologic and obstetric histories disclosed 10 vesicovaginal fistulas, an incidence of 1 to 1,000.

2. The fistulas in these 10 women resulted from obstetric causes in 4, from obstetrical-surgical causes (vaginal cesarean section) in 1, and from surgical causes in 5.

3. Twenty-seven operations were necessary to close these 10 bladder fistulas; of these, 8 were performed by other surgeons and 19 by me.

4. The largest number of operations on one patient was 6, and the smallest number was 1.

5. Nine of these fistulas were closed through the vagina and one by a suprapubic extraperitoneal operation. No fistula was closed by the suprapubic intravesical method which was used four times.

6. I was successful in closing 9 of these fistulas while the tenth was closed by another surgeon after I had failed at a previous operation.

7. The various operative methods are discussed and the details of 10 cases are reported.

DISCUSSION

DR. JOSEPH L. BAER, CHICAGO, ILL.—The three factors that enter into success in the treatment of vesicovaginal fistula are the preoperative preparation of the patient, the technic, and the postoperative care. Dr. Phaneuf takes infinite pains and unlimited time in preparing the patient. The points in technic which stand out are first, the fact that he retains the use of silver wire for the vaginal closure. You will have noted that he obtained primary results for the first three of this series by using the classical Sims' method of through and through silver wire. In the fourth, where he used only chromic catgut, he had a failure; and in the remainder where he used a combination of buried chromic catgut and silver wire for the vaginal mucosa he had six successes.

With the ordinary vesicovaginal fistula, I think it desirable when possible so to place the lines of repair in the bladder and the vagina, respectively, that they are not directly overlying; if possible they should be stagger sutures. Second, for the high, rather inaccessible and very small fistula, it is sometimes simpler to circumcise the vaginal orifice and invaginate the cuff into the bladder. The harm to the bladder is nil, the excrescence usually smoothes out. Third, if the fistula presents near one or the other ureteral orifice, the line of closure of the bladder should be so planned as not to angulate the ureteral orifice.

The injection of the bladder with dye stuff after closure of the fistula, as recommended by many writers is, I think, useless. Some years ago I used catheterization at eight-hour intervals. Later, I adopted the Pezzer permanent catheter. Recently, I have used the sewed-in plain catheter, first, because of simplicity of removal, and second, for fear that the Pezzer catheter might make pressure necrosis along the line of closure. Drainage over the foot of the bed plus abdominal posture as recommended by Schmitz of St. Louis is an added measure of safety.

DR. W. WAYNE BABCOCK, PHILADELPHIA, PA.—Why do vesicovaginal fistulas sutured with catgut often fail to remain closed? When catgut is put in the tissues, healing does not occur at once around it, for immediately a defensive reaction is aroused. About the catgut there is swelling and exudation of serum and leucocytes,

being 1,500 c.c. The patient went into shock; 300 c.c. of a 20 per cent glucose solution was given in the vein and adrenalin and caffeine administered. The diagnosis made at this time was atony of the uterus. The patient lived nine hours. The uterine cavity was thoroughly explored and no tear found. Autopsy was performed after an undertaker had perforated the uterus with a trocar. Diagnosis at autopsy: Incomplete rupture of the uterus.

CASE 2.—Mrs. M. S., white, aged twenty-two years, gravida iii. Two previous spontaneous full-term deliveries. Prenatal care was inadequate. Had headaches for two days without notifying Center. Our doctor was called on Dec. 22, 1933, and found her blood pressure 130/70 and 4+ albumin in her urine. The patient was irritable and had a transient hemiplegia of the left side of the face; fetal heart tones regular; dilatation 4 cm., station +1. Delivered spontaneously. She was given $\frac{1}{4}$ gr. of morphine sulphate and 1.5 gr. of luminal immediately following delivery. Her blood pressure was 108/60, pulse of 90. The paralysis had cleared up and she vomited once. Four hours later her husband reported that the patient was having convulsions. We arrived on the case thirty minutes later and found the patient dead in bed. Autopsy was refused. Clinical diagnosis: Acute eclampsia. The baby lived.

CASE 3.—Mrs. M. C., white, thirty-five years old, gravida iv; had two spontaneous deliveries and one induced abortion. Labor lasted eight hours and was normal throughout. Placenta and membranes were retained and severe postpartum bleeding ensued. Treatment: Manual removal of the placenta; uterine packing; 20 per cent glucose solution in the vein; normal saline solution was administered under the skin, pituitrin, and gynergen were given. The patient died two and a half hours later from primary hemorrhage. Autopsy was refused. Diagnosis: Postpartum hemorrhage due to retained placenta. The baby lived.

CASE 4.—Mrs. A. D., colored, nineteen years old, gravida i. She precipitated at term. No rectal or vaginal examinations were done. At the time of her delivery she had an upper respiratory infection; her temperature was 99° F. and pulse 92. On the following morning her temperature rose to 103°, pulse 120, and she complained of pain in the left lower quadrant. She had a moderate chill at 5 P.M. and at 6 P.M. her temperature went to 97° and her pulse was 80 but of poor quality. She was sent to a hospital where she died on her ninth postpartum day. Autopsy was performed and demonstrated a ruptured pus tube on the left side with a generalized peritonitis. The baby lived.

CASE 5.—Mrs. M. Y., colored, twenty-five years old, gravida ii; had one spontaneous abortion at the fifth month. Physical examination was negative except for generally contracted pelvis; Wassermann negative. The first day of the last period was on May 5, 1932; in December, 1932, she had had an upper respiratory infection with complete recovery. She went into labor on Feb. 6, 1933, the second stage lasting four hours because of a persistent occiput posterior. She was delivered by manual rotation, midforceps, episiotomy, and manual removal of the placenta for postpartum bleeding. During delivery ether anesthesia was administered for thirty-five minutes. At the time of delivery her temperature was 99.2°, pulse 80, and blood pressure 125/80. On Feb. 13, 1933, sutures were removed and her perineum appeared normal. On February 15 she had a chill and a swelling was noted on the left labia majora. At this time her temperature was 102° F. and pulse 100. The episiotomy incision was reopened under ether narcosis because of the patient's refusal to cooperate. She was sent to a hospital on February 17 under the care of a private physician, and died the following day. Autopsy findings were an infected perineum, Bartholin abscess and a bronchopneumonia probably due to the ether anesthetic. The baby lived.

PREMATURE SEPARATION OF THE PLACENTA IN PRIVATE PRACTICE*

ROBERT L. DENORMANDIE, M.D., F.A.C.S., BOSTON, MASS.

THIS paper is based on an analysis of thirty cases of premature separation of the placenta, partial or complete, that I have met in private or consultation work. It is purely a clinical study. The final diagnosis was established when the inspection of the placenta after delivery showed dark, blood-infiltrated areas with blood clots adherent or when the actual separation was seen at the time the section was performed.

I have divided the cases into two groups: the first, where delivery took place by vagina, 16 cases; and the second, where a cesarean section was done, 14 cases. In the first group, except for 3 cases which I shall speak of later, all can be regarded as mild cases of partial separation. I shall discuss briefly the outstanding signs and symptoms in these 13 cases and the results obtained, and then speak of the other 3.

Only one patient in this group showed any toxemia. All were in active labor when the first suggestion of separation of the placenta occurred. Two signs of impending trouble appeared in this group at about the same time—bleeding and the absence of normal uterine relaxation. One or the other of these two signs was present in all. As the normal uterine resiliency became less, tenderness on palpation of the uterus appeared, and the patients complained of varying degrees of pain, many times when they were having no uterine contractions. In no case was there excruciating pain. In one case the patient complained of severe pain in the upper left quadrant of the uterus, but the uterus was contracting satisfactorily, and there was only a small amount of show. Marked fetal motion occurred a short while after this pain appeared, and on rupturing the membranes a large amount of blood-stained fluid came away. A version was immediately done. The baby was in pallid asphyxia but was soon resuscitated. Pain is not an outstanding symptom.

Four were primiparas and nine were multiparas. Three had quick, normal deliveries, one at full term, one at eight months, and one at six and a half months. The last two babies were stillborn. Ten of these patients were delivered as soon as the soft parts permitted.

The one patient who showed toxemia had a bag inserted; the bag was expelled and in a short while bleeding began. The uterus did not relax satisfactorily and a version was done at once, but the baby was lost.

*Read at the Forty-Eighth Annual Meeting of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons held at Skytop, Pa., September 16 to 18, 1935.

Wassermann negative. On March 6 her blood pressure was 170/110, urine negative, but she complained of some edema of the hands and feet and also headache. She was told to return in one week but this she failed to do. She died suddenly during the night of April 2, most likely during her sleep as she gave no warning of this impending tragedy. It was a coroner's case and no autopsy was performed; the clinical diagnosis was eclampsia.

CASE 11.—Mrs. S. G., white, aged thirty-three years, gravida v. She had had four previous spontaneous deliveries. The first day of her last menstrual period was Sept. 18, 1932. General physical examination was negative. On June 24, 1933, she had an easy spontaneous labor lasting fifteen hours. On July 5 she was discharged in good condition, but on July 17 she complained of headache, nausea, vomiting, and pain in the chest. The abdomen, pelvis and lower extremities were normal, but there were fine râles in the chest. On July 18, 1933, her headache became more severe and she complained of severe pain in the epigastrium. On July 20 her temperature was 101.2° F., pulse 84. Examination showed the throat to be injected, râles throughout the chest, the abdomen negative except for tenderness over the gallbladder region, pelvis negative. She was sent to a hospital on July 21 and was discharged to her home on July 27. On the twenty-ninth of July her temperature was 102.6° F., pulse 84, and she appeared semicomatose. Because of the physical findings a tentative diagnosis of tubercular meningitis was made. She was again sent to the hospital on August 1, where she died on the tenth. An autopsy was performed and the diagnosis of tubercular meningitis confirmed.

CASE 12.—Mrs. J. O., white, aged thirty-eight years, gravida vii, had two spontaneous abortions; one premature stillbirth at the seventh month and three full-term spontaneous deliveries. Wassermann 4+, for which she received intensive anti-syphilitic treatment. She last menstruated in November, 1933, and was delivered spontaneously of a three-pound stillborn premature infant on May 8, 1934. At the time of delivery her temperature was 100.2° F. and pulse 106. Later in the afternoon her temperature was 101° and pulse 120; blood pressure normal; râles were heard in the right lung. On May 9 her temperature was 102.2° F. and pulse 134. On May 12 temperature was 101.6° F., pulse 114, and respirations 30. She was seen by a consultant who made a diagnosis of cavity formation and fluid in the right chest. The patient was sent to a hospital where she died on May 20, 1934. Autopsy diagnosis: Pulmonary tuberculosis.

An analysis of these 12 fatalities reveals that there were 2 primiparas and 10 multiparas; 6 white and 6 colored. One patient died from rupture of the uterus, 1 from postpartum hemorrhage, 1 from ether pneumonia, 2 from some form of tuberculosis (meningeal and pulmonary), 3 from eclampsia, and 4 from sepsis. Relative to the fetal outcome in these cases where the mothers died, 8 babies were born alive and discharged in good condition; 2 were stillborn (due to syphilis in one and toxemia in the other); 1 baby perished unborn in an eclamptic mother's uterus, and 1 died fifteen days after birth from some blood dyscrasia.

SUMMARY

1. This report covers a series of 6,863 cases, of which 6,537 were delivered in poorly furnished, unsanitary homes during a period of two years.

2. The operative incidence was approximately 4 per cent, on which 74 per cent were forceps deliveries.

3. There were 45 cesarean sections, or one in 152 deliveries, an incidence of 0.65 per cent.

Now turning to the group of 14 patients who had cesarean section, they were equally divided between primiparas and multiparas. Two were full term, 8 were in the eighth month, 3 in the seventh, and 1 was only six and a half months advanced in her pregnancy.

Four had a toxemia of pregnancy with the blood pressure elevated, the highest being 180/100. This patient was also blind when operated upon. All these patients had large traces of albumin and casts in the urine. One had an eclampsia. Nine showed no signs whatsoever of toxemia.

Six patients complained of absolutely no pain of any type. In 4 the pain was very slight, amounting only to a vague discomfort. Three had severe, excruciating, constant pain, and the one patient with eclampsia was comatose.

The uterus had a normal feel, and there was no bleeding in only 2 cases, and those were the ones in which a separation was found while the cesarean section was being done, but the cesarean section was not done because of the separation. In 1 patient bleeding appeared shortly after labor started, but the uterus felt normal. In only 4 patients was the uterus recorded as being of stony hardness, and three of these showed a toxemia. In 6 cases the uterus was tender on palpation and the relaxation was poor, the patients taking the palpating hands off the abdomen.

The lack of normal resiliency was the most characteristic and constant symptom which occurred in these cases. The one patient who had eclampsia was being treated conservatively. She was in labor when she began to bleed by vagina, and the uterus became rigid. It was then that the diagnosis of a separation was made and a cesarean section done.

None of these patients were in active labor, and in the ones who were examined there was no dilatation. The presenting part was low in the pelvis in 7 of the cases. In only 3 was the pulse rapid. Evidence of shock was present in only 2 cases.

The classical cesarean section was done in all these patients, and the placenta was found completely separated in 7 and partially separated in 7. In 8 there were marked ecchymoses present. In 10 cases the babies were either stillborn or died shortly after delivery. In 4 the babies lived, and in 3 of these the uterus was markedly ecchymotic.

In all these cases the patient was operated upon as soon as the operating room could be made ready. In all the cases, the mothers made a satisfactory convalescence.

In only one case was rotation of the uterus present.

This patient was supposed to be seven months advanced in her pregnancy, and she presented at least an eight months' uterus. On palpation the uterus was tender and firm. Rectal examination showed that the fornices were bulging. There was no dilatation. I did a cesarean section, but the cause of the increased size of the uterus was hydramnios and not blood as I had suspected. The placenta, however,

THE OCCURRENCE AND SIGNIFICANCE OF DECIDUAL CHANGES OF THE ENDOMETRIUM IN EXTRAUTERINE PREGNANCY*

R. S. SIDDALL, M.D., DETROIT, MICH.

(From the Department of Obstetrics and Gynecology, Harper Hospital)

IN THE field of obstetrics and gynecology extrauterine pregnancy is outstanding as a condition involving great uncertainty in diagnosis due to the variability of symptoms and signs. This is the more regrettable since the treatment is so well defined. The pathology likewise is fairly well understood, and our knowledge here has been extended to the associated changes in the uterus, especially since the work of Sampson published in 1914. The presence or not of one of these changes (the decidual reaction of the endometrium) has received some attention as an aid in differential diagnosis. Yet, textbooks show lack of agreement and indefinite information as to what assistance can be expected from the examination of uterine curettings in suspected cases. Williams said, "Formerly, such stress was laid upon the presence of decidual tissue that in doubtful cases curettage was recommended for diagnostic purposes. My own experience has taught me that while the presence of decidua in such circumstances usually affords strong presumptive evidence, its absence is not equally convincing, for in many instances the decidua may have been replaced by normal endometrium by the time the patient is examined." Graves stated that, "Microscopic examination of curettings gives some information, for if chorionic villi are present ectopic pregnancy may be ruled out. Sometimes, however, the fetal remains of a uterine abortion disappear rapidly whereas the decidual reaction may exist for a considerable time." Other authors of textbooks stress the diagnostic importance of the procedure on the one hand or its unreliability on the other, some make little or no mention of it, while still others consider curettage too fraught with danger in ectopic pregnancy to be used for diagnosis.

A review of the more recent literature does not support the belief that curettage is unduly dangerous in extrauterine pregnancy. Indeed, it is not reasonable to expect it to be as likely a cause of rupture as bimanual examination. If this is true, the question, then, concerns itself with the reliability and usefulness of the procedure. Consequently, a study was made of the 24 cases of histologically proved

*Read before the Detroit Obstetrical and Gynecological Society, May 7, 1935.

was transfused on the table. In closing the uterus several sutures cut through the uterine musculature, but on taking deeper bites the uterus was satisfactorily closed and acted well. She left the operating table in good condition. She made a good convalescence and was discharged well.

The fourth patient was six and a half months pregnant, thirty-six years of age, in her fifth pregnancy. She had had one previous cesarean section, the reason for which I was never able to discover. While she was under my care she had had a very variable blood pressure, running from 160/104 down to 120/70. At times she would show the slightest possible trace of albumin but at no time did she have any casts. She began to flow steadily with bright red blood and complained of a severe, constant backache. When I saw her at the hospital the uterus was firm and tender. A rectal examination showed no dilatation, and because of the fact that she had had a previous cesarean section I elected to do another even though she was only six and a half months advanced. I found the uterus was ecchymotic in the mid-line at the bladder reflection, running up anteriorly, and also there was ecchymosis on the posterior wall of the uterus. The placenta was free with many large clots in the uterus. The uterus was closed in three layers and acted well. She made a satisfactory convalescence.

These two groups of cases, and especially the last, bring to mind a totally different picture from that often drawn. I agree that the signs and symptoms in some of the fulminating cases appear in quick succession. In these cases the tragedies of obstetric work appear. But I maintain that if the mortality is to be lowered in these cases the milder symptoms, which are much the more common, must be evaluated earlier and appropriate treatment instituted at once. Shock is not always present; toxemia is not always present; bleeding is not always present; pain is not always present. The condition may appear early in pregnancy, in primiparas as well as in multiparas. In other words, it may appear in any pregnant woman with most variable symptoms.

The one sign that to me is most important is the change in feel from the normal uterine resiliency. I believe that the earlier this is recognized, the better will be our results, provided there is no delay in operating. The time element in these cases is of the greatest importance. They do not tend to spontaneous cure. Watchful waiting is not justifiable, and that is why it seems to me frequent hemoglobin readings, measurements of the uterus, attempts to coagulate the blood, all are futile. The longer the delay in emptying the uterus after a separation has occurred the greater the probability that the dissociated uterine muscle will not act well and hysterectomy may be necessary. In no case was this indicated in the present series.

Frankly, I do not know the cause of this complication. Trauma played no part in these cases. I do not believe that rotation of the uterus is the cause. The usual toxemia of pregnancy and eclampsia may be present, but some other toxic condition of unknown origin is to me the more likely cause.

It would be interesting to know the further histories of all these cases, but I have not been able to follow them up. I do know, however,

of endometrium found. Since abnormal vaginal bleeding is considered to be a reliable sign of beginning ovular death, which results in subsequent desquamation of the decidua, the cases were tabulated according to the time elapsing between the onset of this bleeding and securing of the specimen. Pain is considered by some to have equal significance with bleeding in regard to the beginning death of the ovum. In this series the two were usually coincident, though in a few cases pain preceded by a few days. In four instances pain definitely followed bleeding: Case 14, thirteen days; Case 19, twenty-seven days; Case 20, ten days; and Case 24, twelve weeks. A rearrangement of the table, however, with pain as the criterion, would make no essential difference in the occurrence of decidua in relation to beginning ovular death.

Table I shows that decidua was present in 16 of the 24 cases. In 5 instances, where bleeding had lasted a week or less, decidua was found in all. When it had lasted between one and two weeks, decidua was present in 4 out of 5 cases. In the remaining 14, with the onset of bleeding more than two weeks before the endometrium was obtained, a decidual reaction was found in seven. In one of these (Case 18) the compact layer had been largely lost. The remaining spongy layer was typical of pregnancy, but such a finding would naturally

TABLE I. HARPER HOSPITAL CASES OF EXTRAUTERINE PREGNANCY, SHOWING DURATION OF VAGINAL BLEEDING AND TYPE OF ENDOMETRIUM

H. H. CASE NUMBER	SPECIMEN OBTAINED BY—	L.M.P.— DAYS BEFORE SPECIMEN OBTAINED	ONSET OF HEMORRHAGE— DAYS BEFORE SPECIMEN OBTAINED	ENDOMETRIUM TYPE
1. 73918	Curettage	49	1	Decidua
2. 84937	Curettage	50	4	Decidua
3. 96097	Curettage	54	4	Decidua
4. 57104	Pieces expelled	66	5	Decidua
5. 59430	Curettage	48	5	Decidua
6. 114405	Curettage	67	10	Decidua
7. 112973	Decidual cast	64	11	Decidua
8. 92097	Curettage	45	13	Decidua
9. 90394	Curettage	52	14	Decidua
10. 103507	Curettage	20	14	Proliferative
11. 87922	Curettage	?	18	Decidua
12. 103241	Curettage	77?	18	Proliferative
13. 62806	Hysterectomy	65	23	Decidua
14. 43171	Curettage	25?	25	Early decidua
15. 113463	Curettage	62	27	Proliferative
16. 111788	Curettage	51	30	Early secretory
17. 57022	Curettage	90 + or -	30	Early secretory
18. 88276	Curettage	76	32	Decidua glands
19. 41519	Hysterectomy	75	34	Decidua
20. 113045	Curettage	79	34	Proliferative
21. 80620	Curettage	56?	56	Decidua
22. 47228	Curettage	117?	63?	Middle secretory
23. 97039	Curettage	94 + or -	65 + or -	Decidua
24. 113305	Curettage	146 + or -	85 + or -	Proliferative

sure that the patient is able to stand the delivery, and she should not be delivered until she is in condition to stand it. That means that whenever there is any doubt the patient should be fortified by blood transfusions before delivery, and while on the table, and, if necessary, transfusion may be repeated afterward. The mistake is often made of delivering and transfusing afterward. Prophylactic transfusion is the secret of bringing these patients through.

As I have pointed out before, antepartum predisposes to postpartum hemorrhage. There comes a time when the uterus loses all its contractile power and will not respond to drug stimulation. If you let the patient come to that stage it is almost impossible to make the uterus contract again. There is a vicious circle; bleeding causes relaxation of the uterus, relaxation causes more bleeding, and the important thing is to anticipate that condition and not let it occur.

DR. FOSTER S. KELLOGG, BOSTON, MASS.—Statistics in placental separation are not useful to date for drawing just conclusions as to the best treatment. The inclusion of a variable number of low attached placental separations on the one hand, and "chronic nephritis" four to six months' miscarriages on the other, vitiates the statistics. Neither of these conditions plays any part in the immediate maternal mortality of premature separation of the normally implanted placenta.

For many years we accepted abdominal cesarean section as the best treatment for what others have called "tragie" cases, and it was our opinion that our results by this method were excellent. Check-up, however, showed a maternal mortality of 22 per cent by this method; subsequently it was 15 per cent in a longer series. For this reason the policy of treatment in the cases with a dead baby was changed to the Rotunda method, i.e., tight pack, Spanish windlass and normal or nearly normal delivery, abdominal section being reserved for the ones with a reasonably good fetal heart. A small series by the Rotunda method has been reported by Dr. Irving, with relatively good results.

DR. IRVING W. POTTER, BUFFALO, N. Y.—I know of no way by which one can determine the degree of detachment or how much of a detachment he will have to deal with later. Neither do I know of any way one can tell how much of a placenta will present and how much will not. For that reason I think the best results in these patients are obtained when they are treated surgically.

In the so-called tragie case, transfusion is all right in our experience for blood loss and in early shock, but in prolonged shock I have my doubts as to its value. The operation of choice in the tragie case is the Porro operation, where the uterus is taken out, the child being in the unopened uterus and then removed from the uterus on the outside. That is an operation where there is practically no blood lost, transfusion can be carried on immediately and the patient is benefited. The cesarean section followed by hysterectomy is a blood-losing procedure, and if you will go back over your histories of cesarean section you will find that many of your patients have died from a hemorrhage that has occurred after the relaxation of the uterus, even one-half to three-quarters of an hour after the patient has been removed from the operating table. With the Porro operation that does not occur. You take out the uterus, the detached placenta is in it, you transfuse the patient, and there is no postpartum blood loss.

DR. WILLIAM T. McCONNELL, LOUISVILLE, KY.—Careful examination of all placentas shows us that there are a great many partial separations which give no symptoms and are only diagnosed at delivery. I agree with Dr. DeNormandie that premature separation is not necessarily due to toxemia of the patient, but to a pathologic condition of that individual placenta. The tonic uterine contraction that we find is not due to distention with blood or fluid, but to an effort on Nature's part to stop the bleeding by a tonic contraction, and therefore gives no indication of the amount of blood that has been lost already.

Sampson's article is based on the examination of 25 uteri removed at the time of operation for ectopic pregnancy. The two cases with bleeding of less than a week showed decidua, but where bleeding had lasted from one to two weeks, he saw decidua in only one out of three. He also found decidua twice where bleeding had lasted twenty-five days and four weeks, respectively, but in the remaining 18 cases, with bleeding of three weeks to seventy-two days, decidual changes were not present. In four instances he stated that neither fetus nor villi was found. These might justifiably be eliminated from calculation as unproved ectopic pregnancies, as was done in three of the Harper Hospital cases.

Geist and Matus reported 39 cases in which the endometrium was obtained by curettage in 23; by hysterectomy, abdominal hysterotomy, and autopsy in 8; and from decidual casts in the remainder. They found decidua in 10 of 11 with bleeding up to one week (three had none), in 7 of 12 with bleeding for more than one week and up to two weeks, and in 6 out of the 16 with more prolonged bleeding. The not unusual persistence of decidua after prolonged hemorrhage suggested that bleeding was not the only controlling factor in the expulsion of casts. The same was thought in regard to fetal death. They stated that a viable fetus was sometimes found after fourteen to forty-eight days of bleeding. Furthermore, the higher incidence of decidua with slight bleeding led them to believe that "spotting" was of less importance than frank hemorrhage as indication of ovular damage.

Moritz and Douglas reported 53 cases of ectopic pregnancy with decidua in eight. Among 12 cases with recent or no bleeding only 2 showed decidua, and throughout there was found little or no relationship between type of endometrium and length of the bleeding period. In fact, they reported decidua in two instances after eight weeks of bleeding but also six cases without decidual reaction and without history of hemorrhage.

Börner examined the endometrium obtained by curettage in 30 cases, finding decidua in fourteen. After a slight correction of his figures to correspond to definite statements regarding bleeding in his case protocols, there are found to be 11 with bleeding one week or less before curettage, of which 10 showed decidua. In the four with bleeding from eight days to two weeks there was one with decidua. With bleeding beginning earlier (up to fifty days) decidua was present in only three out of fifteen. Börner further attempted to correlate the cyclic stages of the endometrium (without decidual changes) with the duration of the bleeding.

Table II shows the incidence of decidua in all five series, the cases being grouped according to the onset of abnormal bleeding before obtaining the endometrium specimens. Apparently, when bleeding has lasted one week or less (and this is true as an average even with the low incidence reported by Moritz and Douglas), there is an excellent chance of finding decidua at diagnostic curettage. The figures given by Moritz and Douglas could be considered as confirming the warning that the absence of decidua, even in early bleeding, is not reliable negative evidence. After the first week of bleeding, the presence of decidua in the uterus is much less frequent. Yet, when found, there is no obvious reason to question its significance.

There is no ready explanation for the almost uniformly higher percentage of decidua findings in the Harper Hospital series. It should be mentioned that specimens were traced through the laboratory files

INTERMEDIATE REPAIR OF INJURIES RESULTING FROM CHILDBIRTH*

STEPHEN E. TRACY, M.D., F.A.C.S., PHILADELPHIA, PA.

(From the Stetson Hospital)

GESTATION, labor, and the puerperium are termed physiologic processes. Although this is undoubtedly true in a certain percentage of cases, nevertheless, there are many women who develop complications during these periods which demand serious consideration. The vast majority of primiparas, and a goodly percentage of multiparas, are lacerated to a greater or lesser extent during labor. The repair of these lacerations is the topic for discussion in this presentation.

It is claimed that a laceration in some part of the birth canal occurs in every primipara during delivery. This statement on the surface would seem to be an exaggeration. However, in a careful study in a postpuerperal clinic of patients in whom there had been chiefly spontaneous deliveries with a minimum of interference, perineal lacerations, either recent or old, were encountered in 63 per cent, and lacerations of the cervix uteri in over 90 per cent.

It is unanimously agreed that if the patient is to be symptom-free, lacerated tissues in any part of the birth canal should be repaired. It follows, therefore, that every injury to the birth canal must be repaired before the patient is discharged from the hospital. Unfortunately, only a small percentage of the patients are afforded such treatment. To do this repair work successfully, one must not only be familiar with the normal pelvic structures, but also must understand the mechanism by which these injuries are inflicted. A sound obstetric experience is a necessary prerequisite if one may hope to secure the best results from pelvic plastic surgery.

During labor the damage from the presenting part may be limited to the anterior segment of the pelvic floor. As the head descends, the bladder and anterior wall of the vagina are pushed downward so that the strong fibrous tissues may be separated, producing a relaxation which in many cases is followed by a cystocele or an urethrocele.

When the pressure of the descending head is inflicted on the tissues in the posterior segment of the pelvic floor, there may result a submucous separation of the deeper structures. Such injuries are fre-

*Read at the Forty-Eighth Annual Meeting of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons held at Skytop, Pa., September 16 to 18, 1935.

OBST. & GYNEC. 17: 151, 1929. (4) *Graves, W. P.*: Gynecology, ed. 4, Philadelphia, 1928, W. B. Saunders Co., p. 615. (5) *Kaufman, E.*: Quoted by Börner. (6) *Liepmann, W.*: Quoted by Börner. (7) *Moritz, A. R., and Douglas, M.*: Surg. Gynec. Obst. 47: 785, 1928. (8) *Novak, E., and Darner, H. L.*: AM. J. OBST. & GYNEC. 9: 295, 1925. (9) *Sampson, J. A.*: Surg. Gynec. Obst. 18: 587, 1914. (10) *Scheffey, L. C., Morgan, T. R., and Stimson, C. M.*: AM. J. OBST. & GYNEC. 14: 103, 1932. (11) *Williams, J. W.*: Obstetrics, ed. 6, New York, 1930, D. Appleton-Century Co., p. 805.

A STUDY OF 4,000 PATIENTS ADMITTED FOR CONTRACEPTIVE ADVICE AND TREATMENT

RUTH A. ROBISHAW, M.D., CLEVELAND, OHIO

IN A period of approximately six years, from March, 1928, until January, 1934, 4,000 patients have been admitted to the Maternal Health Clinic of Cleveland for advice as to family regulation. The routine of the organization has been such as to afford peculiar opportunity for studying each case in detail. The number of patients available and the duration of their clinic contact have been conducive to accumulating a volume of organized information affording significant observations and deductions.

In the group of 4,000 cases under discussion, 2,869 have been admitted for health reasons. Great variety of disease is to be found recorded among these patients. Patients admitted for health reasons differ qualitatively as well as quantitatively. Apart from those instances in which the health reason resides in the husband or existing progeny, definite grouping has been possible into those women exhibiting organic or functional disease, those having experienced morbidity which may return with ill-timed pregnancy, or those being now in a condition which conservative medical opinion regards as inopportune for the increased burden of pregnancy. For all practical purposes, that group accepted for organic disease indication may be considered as exhibiting permanent, structural change. For these women a contraceptive program has been prescribed to constitute a recognized part of the therapy. Foremost in this group have been patients with tuberculosis, heart disease, or kidney disease.

Many conservative workers have widened their conception of the variety of so-called functional diseases that may constitute an authentic basis for contraceptive advice and treatment in effecting improvement or cure of the patient. Malnutrition, marked asthenia, and neuroses of various types have been recorded as the most frequently recurring examples of health reasons of this sort.

Among those who have experienced morbidity such as to indicate contraceptive advice as part of the prophylactic treatment, have been considered those whose morbidity was closely allied with their pre-

Such a procedure will restore the genital canal to a normal condition in but a small percentage of patients. If immediate repair of the cervix and perineum is attempted, it is difficult to evaluate the full extent of the injury.

If those who favor immediate repair will, for the time being, disregard the visible perineal lacerations and examine the patients from five to seven days after delivery, they will be surprised to note how many have lacerations of the cervix uteri with no evidence of spontaneous union; that many lacerations of the perineum which at the time of delivery seemed simple and superficial, are in reality deep and

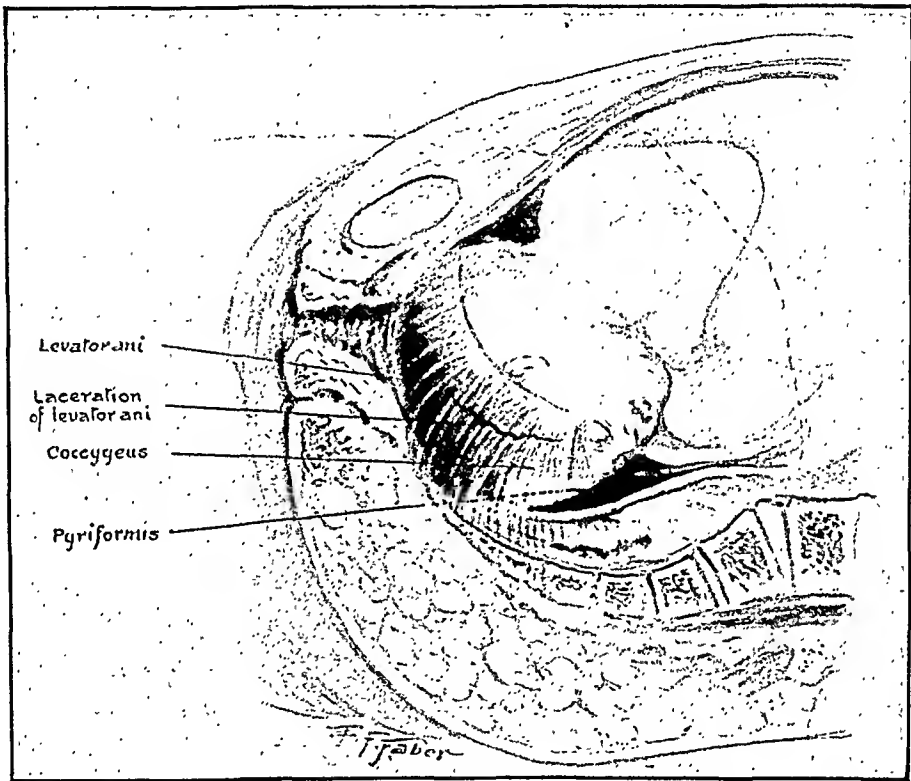


Fig. 2.—Schematic drawing of advancing head against levator and muscle with laceration of muscle.

extensive; that lacerations which were overlooked extend through the vaginal walls and levator ani muscles high up at the side of the vagina, and that submucous separation of the muscles in the perineum and of the supporting tissues under the bladder which were not suspected, exist in a considerable proportion of these women.

The ideal time to do this repair work is after the tissues have recovered from the trauma of labor, usually from five to ten days after delivery. We feel that no patient should be discharged with any of the possible enumerated lacerations to suffer discomforts from scar tissue and from loss of pelvic support, when by intermediate repair the genital canal can be restored to a normal condition, and the patient en-

Upon admission, the sociologic and gynecologic history of the patient is taken in detail. The pertinent gynecologic information considered in this study is that relating to the previous use of contraceptives. Fifteen per cent of the series are recorded as having had no previous experience with contraceptive practices. There is little doubt but that this percentage should be lower, since experience in eliciting the history in this particular has resulted in an ever decreasing number of patients who truly can be said not to have made some effort to control conception. In attempting to organize the group as to its previous contraceptive practice, Table II shows the statistics which have been obtained.

TABLE I. REPRODUCTIVE LIFE OF PATIENTS

NO. OF KNOWN PREG- NANCIES	NUMBER OF CHILDREN BORN ALIVE																	TOTAL NO.	PER CENT
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
0	384																	384	10
1	64	426	1															491	12
2	9	91	518	5														623	16
3	4	27	130	384	2													547	14
4	2	10	55	138	283	1												489	12
5	1	9	28	57	119	175	1											390	9
6		1	16	27	57	71	116	2										290	7
7		1	2	18	24	52	64	81										242	6
8		1	3	5	8	17	29	39	60	1								163	5
9		1	5	1	6	5	16	18	28	41								121	3
10				2	1	4	2	11	18	23	16	1						78	2
11		1		1	1	1	3	7	5	10	25	14						68	2
12			2			1	4	1	8	8	5	8	11					48	1
13				2		1	2	2	3	2	5	5	6	5				33	1
14				1				1		1	1	3	1	3	2			13	*
15							1	1		1		1	1					5	*
16					1		1			1		3		1	1			8	*
17				1							1						1	3	*
18													1					1	*
19														1			1	1	*
21							1											1	*
26												1						1	*
Total	464	568	760	642	502	328	240	163	122	88	53	36	20	9	3		2	4000	100
Per cent	12	14	18	16	13	8	6	4	3	2	2	1	1	*	*			100	

*Less than 0.5 per cent.

The routine of the clinic is to subject the woman to careful pelvic examination, determine the most suitable contraceptive technic, and teach the manipulation of any mechanical advice prescribed at the first visit. Various methods of contraceptive treatment are prescribed according to the indications. Preference is given to the diaphragm pessary used in conjunction with lactic acid jelly. Eighty-eight per cent of the group received such treatment. Other methods advised and the frequency of their prescription are represented in Table III.

it does not interfere with lactation. After the patient is anesthetized the preparation of the pelvic field is the same as for a secondary operation.

In doing intermediate repairs no predetermined operation can be carried out. The damaged structures wherever located are repaired; the object being complete restoration of the parts to a normal condition.

TECHNIC

The first procedure is to dilate the cervix uteri. Any retained detritus is removed with long loop forceps, and the endometrial cavity is dried with gauze. It

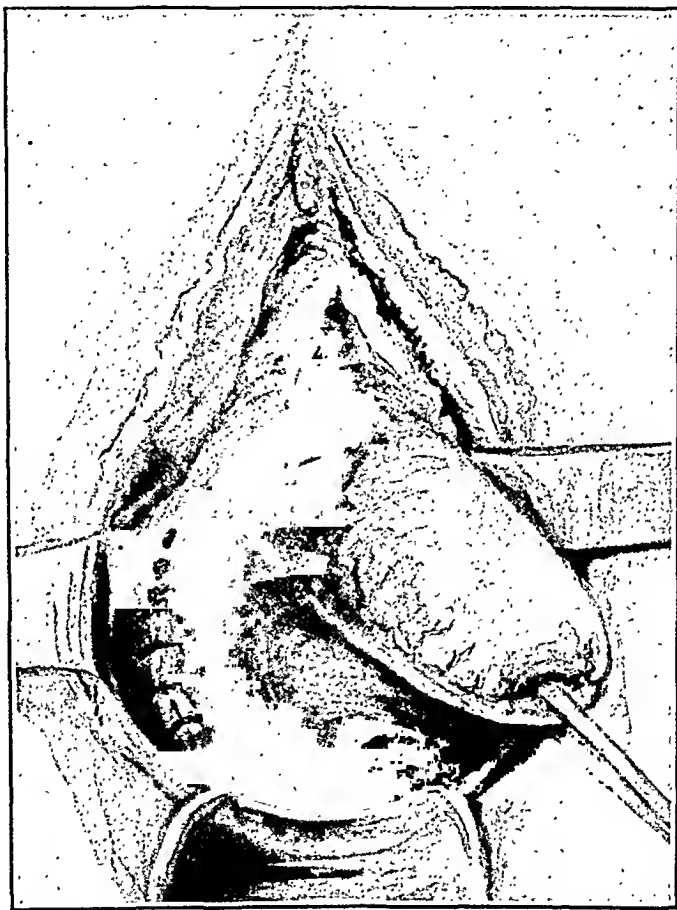


Fig. 4.—Laceration of cervix and laceration through the levator ani muscle below the white line have been repaired.

is surprising how frequently a portion of membrane or a retained piece of placental tissue is found, which is one explanation of vaginal bleeding for several weeks after delivery.

The irregular edges of the cervical laceration are then trimmed and the granulation tissues removed. Interrupted chronic catgut sutures are introduced with a noncutting edge needle. A generous os, at least 1.5 cm. should be provided to allow for involution. Following this any damage to the anterior vaginal wall is repaired as in a secondary operation. The tissues are approximated with interrupted sutures.

The irregular edges of the wounds in the vaginal canal and in the perineum are then trimmed, and the granulation tissue scraped away so that the surfaces will

pessaries with the flat spring rim of the Mensinga style. Among the pessaries of the cervical cap type, the Mizpah has usually been employed. A very few patients have been equipped with Dumas pessaries. Most cases in which a Matrisalus pessary with its characteristic supporting rim might have been indicated have seemed better treated with a Mizpah pessary or mechanical protection for the husband. In every instance the pessary is prescribed to be applied with lactic acid jelly in apposition to the cervix and plentifully applied to the rim in its entire circumference. With scarcely an exception the pessary has been fitted with its concave surface uppermost. Great effort has always been expended to teach identification of the cervix through the occluding pessary. This has almost always been possible. A very few patients have been unable to perform this check of the cervix, usually because of an obese abdominal wall or short intravaginal portion of the cervix. The very inaccessibility of the cervix has made it less likely to elude the inserted diaphragm pessary which is the only type prescribed for such patients. A minimal post-coital interval of six hours is always advised before the pessary is removed and not then until after a douche of at least a quart of plain warm water has been taken. Pregnancies have apparently occurred when the technic has been varied by removal of the device immediately or very shortly after intercourse or by removal of the pessary even after a considerable period of time has elapsed without douching. Preference is given the fountain syringe as the instrument for douching, although careful douching with the bulb syringe has been permitted. Emphasis is always given to the superiority of the reclining position in douching.

The wife has always been equipped with some spermicidal preparation when condoms have been prescribed for the husband. Preference has been somewhat in favor of suppositories over jellies as being easier to manipulate. The patient is directed to insert the spermicidal agent ten minutes before coitus to allow ample dispersion of the medicament. The suppositories are of cocoa butter base, containing as the most active ingredients quinine and salicylic acid. Care is exercised always to dispense a fresh, carefully compounded preparation, capable of prompt dispersion. Whenever jelly has been prescribed in this series as an adjunct to the condom, a formula with 1 per cent lactic acid and 5 per cent boric acid in a glycerite of starch base has been given. In almost every instance, the sheaths are of rubber and are intended to be used a single time only. Instruction is given as to the technic of testing, applying and removing the condom. An immediate vinegar douche is advised in the event the condom is broken in the vagina.

In the few cases in which the spermicidal activity of a jelly or suppository has constituted the only treatment prescribed, a douche

Until the value of intermediate repairs is recognized, gynecologists will be busy repairing old lacerations which were neglected and failures following immediate repairs.

The intermediate repair of all lacerations following labor has been performed on 744 cases. Some of the patients have had intermediate repairs on four successive occasions. In no case has there been any dystocia subsequently from scar tissue in the cervix. The possibility

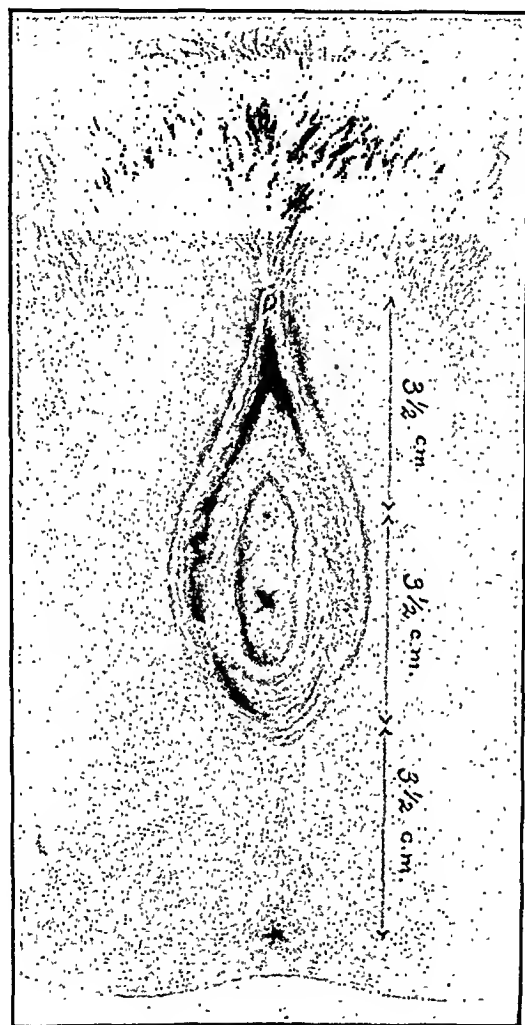


Fig. 6.—Normal perineum with scale from anus to fourchet, fourchet to urinary meatus, and urinary meatus to clitoris.

of lacerations in subsequent deliveries is about the same as in any woman with a normal birth canal.

The morbidity is approximately the same as in other surgical work. We have had no mortality.

This method is not for the general practitioner doing obstetrics in homes with unfavorable surroundings. It is an institutional procedure, but can be carried out successfully in private homes in which the surroundings are satisfactory, where the necessary equipment is available and where a trained nurse is in charge of the patient.

incompatible is having the definite reaction of recruiting fewer women to this truly large proportion of unimproved patients. Certain it is that effort needs always be directed to the end that simpler contraceptive measures be developed as may be consistent with a high percentage of efficiency, freedom from physical or psychic trauma and dissociation with fertility when and as conception is desired.

There have been 221 patients discharged, usually because they have moved out of town, occasionally because they have been transferred to private physicians' care. In forty-six instances, there has come a time when the patient presented herself for examination and diagnosis, suspecting conception has occurred. No positive diagnosis of pregnancy could be made at the time the patient was seen, and these patients are represented in Table V as cases of questionable pregnancy. No further information is available in this group.

TABLE V. OUTCOME OF 4,000 PATIENTS ADMITTED FOR CONTRACEPTIVE TREATMENT

OUTCOME	NUMBER OF CASES
Used successfully	1,760
Discontinued voluntarily	1,353
Discontinued for natural causes	151
Discharged	221
Pregnancy ensued	469
Questionable pregnancy ensued	46
Total	4,000

There have developed 469 pregnancies in the entire series of 4,000 cases. One hundred and twelve of these are pregnancies commenced before the patient began the contraceptive advice prescribed at the clinic. The majority of these pregnancies were already established but not recognized by the physician in the admission pelvic examination. Occasionally pregnancy has ensued even after the method of choice has been determined but before instruction has been completed so as to make its protection available to the women.

Twenty-six pregnancies have been planned. The women in this group have been protected for varying periods of time and have discontinued the method prescribed to permit of conception. Frequently conception has occurred the first month the patient discontinued her contraceptive program. With the exception of two cases, one using condom and lactic acid jelly and another using Lunarol jelly and acetic acid douche, the routine technic of the diaphragm pessary and lactic acid jelly has constituted the contraceptive program that has been interrupted. One patient has interrupted her contraceptive treatment to achieve two planned pregnancies, resuming it after delivery each time to space her pregnancies. Fourteen of these twenty-six patients have returned to the clinic after completing the planned pregnancy to engage again in such contraceptive practice as may be prescribed.

When you have pulled the segment down and looked at it, you will be surprised at its condition. It looks like a plowed field. In women past forty who have had an old cervicitis and a vaginal discharge for years and have to work, we curette that lower segment down pretty thoroughly, removing all the surrounding edges. With a continuous suture rather than an interrupted suture the edges are drawn together on both sides, leaving the os big enough to put in a pair of sponge forceps.

The immediate repair does away with a secondary anesthesia and has been very satisfactory in our hands.

DR. JAMES E. DAVIS, ANN ARBOR, MICH.—Viewed from the standpoint of cell biology, intermediate repair is not as good as immediate repair. Malposition of cells, if maintained for a period of over twenty-four hours, has certain liabilities. Repair processes proceed more slowly after an intermediate repair than after an immediate one. It is the natural biologic procedure to institute an immediate repair no matter where the injury may occur.

Bacteriologically also the degree of liability increases after the immediate period is passed.

Another point: stimulation of plasma cells and of fibroblastic cells begins and is carried on much more actively after the first twenty-four-hour period is past. By doing an immediate repair, then, one should expect less laying down of these materials that are used for repair purposes and excessive formation of scar tissue can be avoided.

Now how can one ascertain the degree of separation of tissues after delivery unless he makes a thorough examination? If that is done, every tear can be found, and it can be repaired at the same time. Recommendation of an intermediate repair admits that considerable damage has been done, which is not good for the psychology of the patient. I have seen three autopsies resulting from tears that were not detected as the obstetricians were not in the habit of making a thorough examination after delivery. In two of these autopsies the tear and the bleeding vessel were easily recognized. If immediate repair had been done, these three lives would have been saved.

DR. B. G. HAMILTON, KANSAS CITY, MO.—In the last two years at the Kansas City General Hospital we have been able to separate Gynecology from Surgery, but unfortunately to date we have had only junior internes on service. This has necessitated delaying pelvic repairs. Only 18 per cent interference was done in 1,000 cases and episiotomies cannot be performed without permission of the staff attendant. The patient suffers more pain, has more edema and seldom is without temperature of 100.4° or more for the first two or three days. We now feel that involution is delayed and that the stay in the hospital is prolonged. In several cases there was an increase in the leucocytosis and one case was fatal, whether due to the delayed repair or not, I cannot say. However, we agree with Dr. Davis that the reparative process is interfered with and that we prefer primary rather than delayed repair.

DR. A. J. RONGY, NEW YORK, N. Y.—The success or the failure of immediate repair of pelvic injuries following childbirth does not entirely depend upon the type of operation which is performed. The relaxation of the vaginal vault and the displacements of the bladder and rectum to a large degree depend upon to what extent the "fixed point" in the pelvis is injured.

E. K. Roberts has recently pointed out that there is a fixed point in the pelvis, situated just above the internal os. It is chiefly made up of connective tissue, radiating in every direction from the uterus to the pelvic bones, and it is these tissues that hold the uterus, bladder, and rectum in their places. If for some reason during labor, especially in cases of severe dystocia, these supporting structures are injured or lacerated, the pelvic viscera will become dislocated. In such cases no op-

at yearly intervals by the physician for examination after the first check-up. More frequent return appointments are arranged as the physical or psychical indications warrant. Under such conditions, fewer patients have discontinued methods prescribed. Careful pelvic examination is a routine procedure with each subsequent reexamination. Much gynecologic disease is encountered in such a large group over the period of time they are active in the clinic. Such patients are directed to private physicians or dispensaries for treatment as indicated in the individual case.

SUMMARY

1. A statistical report of 4,000 patients admitted to the Maternal Health Clinic of Cleveland over a period of six years for family regulation advice, is presented.

2. Sociologic data are at hand to show that classes commonly considered socially and economically handicapped are represented in the series in at least the proportion they occur in the city's population.

3. Seventy-two per cent of the patients have been admitted for health reasons; 17 per cent have been admitted for social reasons; 11 per cent have been admitted for economic reasons.

4. At least 85 per cent of the patients are recorded as being already engaged at the time of their admission in some type of contraceptive practice.

5. Some type of occlusive pessary has been prescribed as the most suitable treatment in 88 per cent of the cases.

6. Forty-one in a group of 4,000 cases have sustained inexplicable pregnancies and are considered failures of the method prescribed; 231 have become pregnant through discontinuing the method; 59 have conceived through misapplication of the method.

25 PROSPECT AVENUE

Horowitz, E. A., Derow, D., and Bierman, W.: Temperature Determinations in the Female Pelvis During Diathermy, *Am. J. M. Sc.* 189: 555, 1935.

By means of a vaginal electrode equipped with a thermometer, the vaginal temperature was observed during 255 pelvic diathermy treatments. With thermometers in the cervix, bladder, and rectum, the temperatures developed in these parts were found to follow closely the vaginal temperature, averaging but 1 or 1½° F. lower. The bladder urine was also heated to a high degree. Hence, the vaginal temperature is a true indicator of the temperatures attained in adjacent tissues. Mouth temperatures and pulse rates were elevated in 80 per cent of the treatments. Also the ineffectiveness of "transpelvic diathermy," by external plate electrodes, as a method of pelvic heating, was once more demonstrated.

J. THORNWELL WITHERSPOON.

paralleled the ascending colon, whereas the other was in alignment with the cecum. Kennedy frankly confesses that upon opening the peritoneal cavity in each case he at first mistook the big mass for a malignant tumor of the cecum.

More than two hundred cases of mucocoele of the appendix have been reported in the literature, several of them within the past ten years. There is no doubt that a great many others have never been placed on record, or have passed unrecognized. Squires²⁰ and Hall⁷ have each described cases in addition to Kennedy's, in which the mucocoele was found invaginated into the cecum. Easton⁴ had a patient who was operated upon for typical acute appendiceal symptoms, and whose specimen yielded a giant mucocoele, plus definite evidence of acute appendicitis. Topping²¹ had a case of carcinoma of the appendix with an incidental large mucocoele.

In a series of 8,457 appendectomies in a ten-year period at the New York Post-Graduate Hospital, a mucocoele was found 8 times, an incidence of almost 0.1 per cent. Seven of the eight patients were women past middle life. In one of these cases the appendix was fusiform in

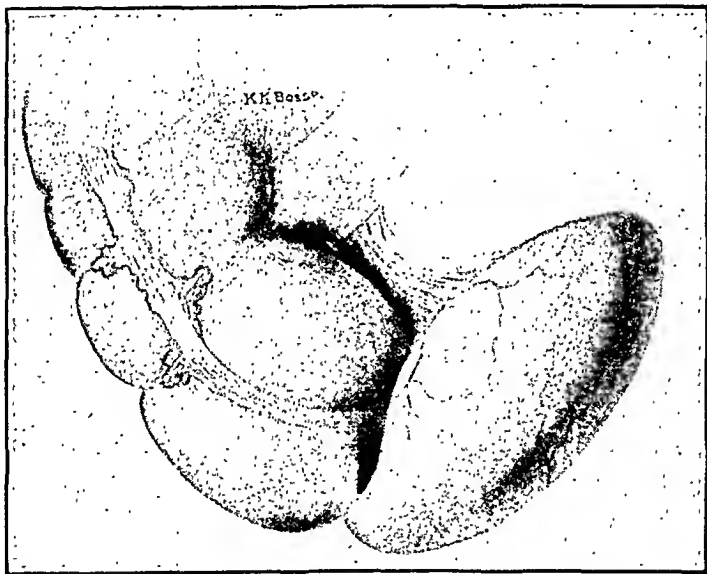


Fig. 1.—Large fusiform mucocoele of the appendix, nonadherent but angulated at its base.

shape and greatly enlarged, measuring 80 mm. in length (Fig. 1). The patient was a woman of forty-nine years, who had complained of dull pain in the right side, both upper and lower quadrants, for many years. An enlarged gallbladder, as well as the appendix, was removed at operation. The distended appendix was kinked at an angle of 60 degrees at its base and constricted at its cecal attachment. The distended portion was translucent and filled with grayish yellow gelatinous mucus under high tension. The lumen appeared to have been completely blocked at its base. Sections of the wall of the appendix revealed no recognizable lining epithelium. The wall consisted of thinned muscle and fibrous tissue with an excess of round cells, and near the lumen there were small collections of mucus without epithelial cells. Another one of our cases was of such an unusual character that a detailed description is justified.

excellent opportunity to investigate the effects of obstetric abnormalities upon puerperal infection. Such an analysis is recorded in the subsequent pages of this paper.

It should be stated that the criteria employed for the diagnosis of a febrile puerperium are as follows: a temperature (mouth) of 100.4° F. or above on any two days of the puerperium, not necessarily successive, and excluding the first twenty-four hours after delivery. The temperature is determined every four hours throughout the patient's stay in the hospital, regardless of the absence of clinical signs or symptoms of infection. The fever is classified as being due to puerperal infection only in the presence of definite signs and symptoms characteristic of that condition and only after other causative factors such as pyelitis, mastitis, or respiratory infection have been ruled out.

The series under analysis includes 5,767 consecutive cases delivered at or near term on the Obstetric Service of the Johns Hopkins Hospital. About 7 per cent of the patients were private, and of the ward material, there were more black women than white, 55.26 and 44.74 per cent, respectively. Considering the great number of abnormal cases, the operative incidence was low, being 19.30 and 22.64 per cent in the black and white races, respectively.

The influence of the following factors on the incidence of puerperal infection have been investigated.

TABLE I. THE INCIDENCE OF PUERPERAL INFECTION AS AFFECTED BY RACE, AGE, AND PARITY

FACTOR	INCIDENCE PER CENT PUERPERAL INFECTION		
	WHITE	BLACK	TOTAL
Race	11.05	20.24	16.13
<i>Age</i>			
To 16	15.93	26.67	24.10
17-19	15.06	22.26	19.80
20-24	10.51	19.27	15.26
25-29	7.47	13.60	10.24
30-34	8.39	20.11	12.71
35 and over	11.95	17.46	13.03
<i>Parity</i>			
1	13.74	23.19	19.16
2	5.31	16.93	12.06
3-4	8.83	12.77	10.72
5-8	6.67	13.86	9.85
9 and over	14.61	22.81	17.81
Total multiparas	7.48	15.90	11.61

Table I and Fig. 1 illustrate the differences in the incidence of puerperal infection according to the race, age, and parity of the patient. It will be noted that the condition was observed almost twice as often

was accomplished from left to right, and as the dissection progressed toward the right iliac fossa, the fatty layers of the mesoappendix were inadvertently opened. Two bleeding vessels were ligated. As the tumor mass was freed from the right adnexa, the fimbriated extremity of the tube and right ovary (no larger than an almond) could be demonstrated. On the lower margin of the head of the cecum the dissecting finger could not discover any plane of cleavage, so the broad attachment of the mass was doubly clamped and ligated. This proved to be the



Fig. 3.—Mucocoele of the appendix sectioned after immersion in formalin; much of the mucus is still in situ.



Fig. 4.—Low power photomicrograph of mucocoele of the vermiform appendix showing hyaline fibrous tissue and foci of lymphocytes. There is no trace of mucosa in this area.

base of the appendix. The tumor ruptured just before its mobilization was completed, and a large amount (more than 100 c.c.) of thick, gelatinous, opaque material oozed through the small perforation. A continuous Lembert suture was used to in-fold the raw surface on the cecum. A cigaret drain was placed in the pelvis, after careful toilet of the pelvic peritoneum. The drain was removed on the second postoperative day, convalescence was uneventful, and the patient was discharged on the thirteenth day.

forceps and breech extractions, shows an infection rate almost three times as high as the group "spontaneous, no tear." Operations requiring intrauterine manipulation, such as version and manual removal of the placenta, naturally resulted in a higher incidence of infection than the simpler procedures just mentioned, and the dangers so often attributed to the latter procedure are amply illustrated in the table.

Table III and Fig. 3 illustrate the striking correlation between the incidence of puerperal infection and the duration of labor. It should be noted that the infection rate increases most rapidly as labor becomes prolonged past normal limits, a fact which is partially explained by the

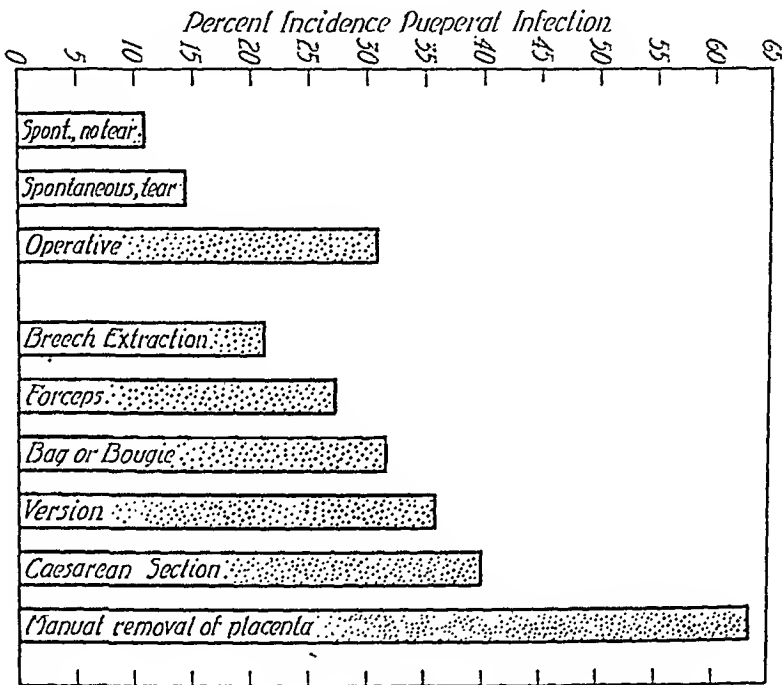


Fig. 2.—The incidence of puerperal infection as affected by the type of delivery.

great number of operative deliveries in these groups. The effect of prolonged labor is further emphasized by the fact that in those patients whose puerperium was normal, the mean duration in hours was three and a half hours shorter than in the group with a subsequent puerperal in-

TABLE II. THE INCIDENCE OF PUERPERAL INFECTION AS AFFECTED BY THE TYPE OF DELIVERY

DELIVERY	INCIDENCE PER CENT PUERPERAL INFECTION		
	WHITE	BLACK	TOTAL
Spontaneous, no tear	7.08	13.85	11.06
Spontaneous, tear	9.26	19.39	14.51
Operative	21.75	39.51	30.86
Breech extraction	20.65	21.74	21.20
Forceps	19.08	36.77	27.22
Bag or bougie	28.13	37.50	31.82
Version	26.58	45.57	36.08
Cesarean section	26.82	47.89	40.18
Manual removal of placenta	57.14	75.00	63.64

appendix is generally found enlarged, but the proximal one-third or one-half may be normal in size, if the lumen is closed that much nearer to the tip. The peritoneal coat is probably not involved in the stenosis, or gangrene would ensue. The complete stoppage of the canal prevents the egress of even the normal mucous secretion, and there is a subsequent insidious and progressive swelling of the appendix, due to a retention of its contents. Sometimes diverticula spring from the dilated walls. As the material accumulates, there is a pressure atrophy of the mucosa, with attenuation and thinning of the muscular and serous coats, with slowly increasing enlargement of the whole obstructed region. The mucocele may be sausage-shaped, fusiform, egg-shaped, nodular, or sacculated. In each of the specimens coming under our observation, it was difficult to identify areas of typical mucous membrane or to recognize muscle fibers, and no tumor elements could be detected. In most instances, the retained mucus becomes opaque and gelatinous, but in others it liquefies to some extent, and with the passing of time becomes watery. Occasionally it contains globoid bodies. In 1901 Fraenkel⁶ first called attention to the fact that as a result of rupture, the contents may become implanted on the peritoneum where they cause a proliferation with formation of large masses of colloid material which are recognized as pseudomyxoma peritonei. The latter condition more often eventuates from the rupture of pseudomucinous ovarian cysts, but Ries¹⁸ has found the rupture of an ovarian cyst and an appendiceal mucocele coexistent, and states that the appendix should always be removed and carefully examined in such cases. He reports two personal cases and refers to numerous others in the literature. Boyd¹ contends that the pseudomyxomatous masses are caused by the implantation of epithelial cells on the peritoneal surface, where they continue to produce their mucinous secretion, but this theory would presuppose the extrusion of tumor cells, which we have been unable to find. Some writers suggest that the mucoid material is potentially malignant, and is thus responsible for uncontrollable metastases when implanted on the peritoneum. However, there is no histologic evidence to prove the source of the pseudomyxomatous proliferation. At any rate, mucocele of the appendix is the only known cause of pseudomyxoma peritonei in the male, whereas it is one of two causes in the female. Since the location and extent of the cystic region depend upon the site of the obliterated point in the mucosal lumen, it seems logical to regard a large tumor of the entire appendix, filled with a homogeneous viscid material as a mucocele; to consider the same type of enlargement with a more fluid content as a hydrops; and to call a small involvement of the distal one-half or less a cyst. If the contents should become purulent, it would constitute empyema of the appendix. Boyd¹ says that a true hydrops, in which the contents are watery, is a rare condition.

Table V shows that in this series there is no increase in the incidence of puerperal infection as the result of rupture of the membranes prior to the onset of labor. Those patients in whom the premature rupture of the membranes occurred spontaneously were usually admitted to the ward at once, and there awaited the onset of labor. However, in a rather large percentage of this group, artificial puncture of the membranes was performed in order to induce labor, and the resultant low morbidity rate adds further confirmation to the recent experience of this Clinic that with proper care premature rupture of the membranes does not add materially to the hazards of the patient. The highest incidence of infection was observed in the group "rupture during the first stage of

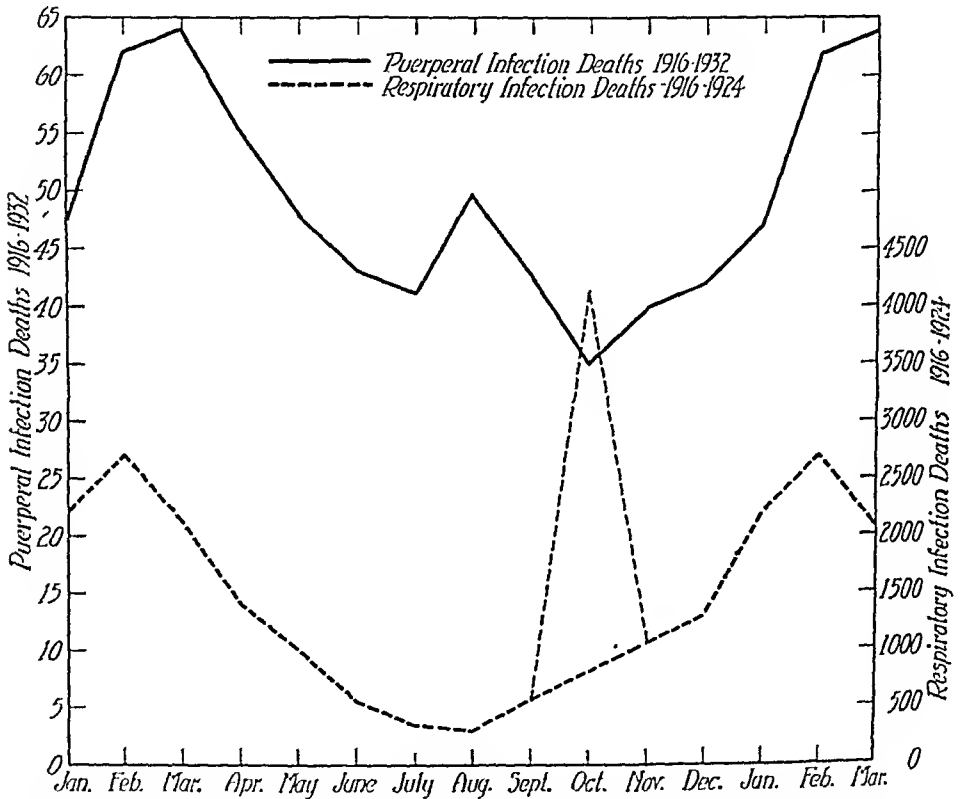


Fig. 4.—A comparison of deaths due to puerperal infection and respiratory infection in the city of Baltimore.

labor." This is probably explainable since spontaneous rupture during the first stage is frequently associated with some abnormality of labor, presentation, or position, and when artificial rupture of the membranes

TABLE IV. THE INCIDENCE OF PUERPERAL INFECTION AS AFFECTED BY THE TIME OF ADMISSION TO THE HOSPITAL

TIME OF ADMISSION	INCIDENCE PER CENT PUERPERAL INFECTION		
	WHITE	BLACK	TOTAL
Before labor	15.49	25.56	21.39
Early in labor (< 3 cm.)	11.01	21.77	17.03
Late in labor (> 3 cm.)	9.27	16.77	13.29
After attempts at delivery	20.00	87.50	61.54

has been freed. This will permit a cautious and safe approach to the meso-appendix, with a minimum amount of hemorrhage. If a rupture with extravasation should occur, a cigaret drain may contribute to the patient's safety, although the mucoid material is usually sterile.

CONCLUSIONS

1. Mucocoele of the vermiform appendix is due to obstruction of the lumen near its base, with subsequent accumulation of mucus beyond the stenotic area.

2. Its clinical incidence is probably about 0.1 per cent. Eight cases are reported herein.

3. The gradual but persistent increase in retained material eventually produces appendiceal enlargement of mammoth proportions.

4. The intrinsic pressure destroys the mucous epithelium, thins and weakens the muscular and peritoneal coats, and predisposes to rupture either before or during operation.

5. In some cases, the retained mucus undergoes liquefaction, resulting in a cystic degeneration.

6. It is one of two known causes of pseudomyxoma peritonei.

7. It is observed most often in middle-aged or elderly women.

8. There are no pathognomonic symptoms.

9. Early clinical diagnosis is extremely difficult and roentgenographic diagnosis usually impossible.

10. Mucocoele of the appendix may stimulate other pathologic conditions in the lower abdomen and pelvis.

11. The treatment is surgical.

REFERENCES

- (1) *Boyd, William*: Surgical Pathology, Philadelphia, 1929, W. B. Saunders Co., p. 380.
- (2) *Cran, Brennan S.*: Lancet 1: 395, 1934.
- (3) *Davison, Marshall*: Internat. Clin. 2: 303, 1922.
- (4) *Easton, E. R.*: Med. J. & Record 138: 463, 1933.
- (5) *Ewing, James*: Neoplastic Diseases, Philadelphia, 1928, W. B. Saunders Co., p. 708.
- (6) *Fraenkel*: München. med. Wchnschr. 24: 1901.
- (7) *Hall, D. P.*: Internat. J. Med. & Surg. 47: 169, 1934.
- (8) *Henke-Lubarsch*: Handbuch der Speziellen Pathologischen Anatomie und Histologie 4: Part 3, 1929, Julius Springer, p. 531.
- (9) *Kaufmann, Edward*: Pathology 2: Philadelphia, 1929, P. Blakiston's Son & Co., p. 839.
- (10) *Kelly, Howard A.*: Appendicitis, Philadelphia, 1909, J. B. Lippincott & Co., p. 76.
- (11) *Kennedy, James W.*: Practical Surgery of the Joseph Price Hospital, Philadelphia, 1926, F. A. Davis Co., p. 190.
- (12) *Le Wald*, quoted by Vorhaus.
- (13) *Lifvendahl, R. A., and Ries, Emil*: Am. J. Surg. 17: 271, 1932.
- (14) *Martin, E. K.*: Brit. J. Surg. 21: 353, 1934.
- (15) *Milliken, Gibbs*: Am. J. Path. 1: 397, 1925.
- (16) *Myers, W. H.*: Illinois Med. J. 43: 386, 1925.
- (17) *Pitts, H. H., and Gee, E. A.*: Canad. M. A. J. 28: 266, 1933.
- (18) *Ries, Emil*: Surg. Gynec. Obst. 39: 569, 1924.
- (19) *Simon*, quoted by Vorhaus.
- (20) *Squires, Charles D.*: New York State J. Med. 31: 285, 1931.
- (21) *Topping, M. Hawkins*: California & West. Med. 29: 186, 1928.
- (22) *Trauba, N. C.*: Wisconsin M. J. 25: 39, 1921.
- (23) *Virchow*: Die krankhaften Geschwülste 1: 250, 1863.
- (24) *Vorhaus, M. G.*: J. A. M. A. 94: 165, 1930.
- (25) *Weaver, Don D.*: California & West. Med. 28: 500, 1928.

pelvic contraction with spontaneous delivery, the rate was only 12.26 per cent, which approximates closely our general experience with this type of delivery.

SEASONAL VARIATION

Through the courtesy of Dr. Huntington Williams, Commissioner of Health for the City of Baltimore, it was possible to obtain figures correlating on a monthly basis the deaths from puerperal infection and respiratory infection in the above community. The results of this analysis are portrayed in Fig. 4. The curve of deaths due to respiratory infection is similar to others previously published, and the October peak, of course, is due to the influenza epidemic of 1918. It will be noted that the curve of deaths due to puerperal infection parallels very closely that of respiratory diseases, except that it follows the latter in all characteristics by about a month. It is our opinion that this finding, although not new, is important, since it emphasizes the close correlation between the frequency of respiratory diseases and the frequency of puerperal infection, a fact not generally given sufficient prominence.

In contrast with the above observation no similar monthly or seasonal variations in the incidence of puerperal infection could be elicited although figures were obtained on a series of 25,000 consecutive deliveries. When charted, the monthly incidence varied considerably with an irrational saw-tooth appearance. The reason for these rather contradictory findings is not clear unless one postulates alterations in virulence of the infecting organisms at the time when respiratory diseases are at their height. Further studies on larger series of cases would seem necessary to clear up this point.

SUMMARY AND CONCLUSIONS

An effort has been made to investigate statistically certain beliefs, most of them well established clinically, concerning the factors which influence the incidence of puerperal infection. It seemed that this could best be done by analyzing a series of cases with a high potential infective risk: i.e., a ward service from the lower social strata with a large number of medical and obstetric abnormalities. The results of this analysis are as follows:

1. The incidence of puerperal infection was almost twice as high among black as contrasted with white patients, being 20.24 and 11.05 per cent, respectively.

2. A definite and steady decline in infection rate was noted with advancing age of the patient up to thirty years. In the higher age groups a secondary rise occurred, but it is felt that this finding is probably an artefact due to a higher incidence of complications in this group.

3. A similar decline in incidence was observed with advancing parity, except in the group para ix and over. It is believed that here the secondary rise was due to the same cause as noted above, since patients of such age and parity would not

If one is not familiar with adhesions, it would be quite impossible to cope surgically with the average mucocoele of the appendix. Four of the 7 cases which I have seen were the most trying operations I have performed within the abdominal cavity, and I was not certain until late in the delivery of the organ of the true nature of the pathologic condition.

DR. WILLIAM H. WEIR, CLEVELAND, OHIO.—A simple mucocoele of the appendix owing to its weight would naturally tend to gravitate into the pelvis and might be mistaken for a cyst of the ovary. That happened in a case in which I was performing a vaginal hysterectomy. After opening the abdominal cavity this "cyst of the ovary" turned out to be a mucocoele of the appendix nearly three inches in diameter. The weight of the tumor had dragged it down into the culdesac, and it was an easy matter to remove it through the vagina.

DR. FREDERICK H. FALLS, CHICAGO, ILL.—I would like to ask whether this material was tested to see if it was mucin or pseudomucin. The determination of this point in these cases might throw some light on the genesis of pseudomucin that we find in pseudomucinous ovarian cysts. If from the mucous membrane of the appendix we can get pseudomucin, it may easily be that the origin of the cells which produce a pseudomucinous cyst of the ovary is in the intestinal tract.

DR. WILLARD R. COOKE, GALVESTON, TEXAS.—We have had two of these mucocoeles, of a size sufficient to be dignified by that name. One patient was a woman who came into the surgical service, the diagnosis on admission being hydronephrosis. This was eliminated by cystoscopic examination, and I was called in to eliminate the diagnosis of a cyst. It was definitely not a cyst nor was it a hydrosalpinx. I thought of a mucocoele, but it was so enormous that we considered that only as a possible diagnosis. It turned out to be a very large mucocoele, about the size and shape of an average hydronephrotic kidney. It was freely movable, adherent to the cecum but not to any surrounding structures.

DR. THEW WRIGHT, BUFFALO, N. Y.—The largest mucocoele I have seen was in a woman eighty years of age. She had a large tumor in the right lower quadrant, was in perfect health, had gone around the world by herself a year before, and had no complaints until six months before I saw her. She had rather typical evidence of a carcinoma of the cecum, and we operated with that diagnosis. I found a mucocoele of the appendix eleven inches long and about three and a half inches in diameter. She made a perfect recovery.

DR. DANNREUTHER (closing).—The material extruded from this mass was carefully gone over and both the pathologist and biologic chemist agreed that it was pseudomucin. No epithelial elements could be found.

Dogliotti, V.: A Contribution to the Study of Vulvar Tumors, *Folia gynaec.-demograph.* 31: 277, 1934.

The author describes a tumor, weighing on removal 330 gm., of the left labium majus in a thirty-two-year-old woman. A very exhaustive discussion of the literature on vulvar tumors is given.

The histologic picture of the tumor in this case in some places is that of an adenoma of the sweat glands, and in other parts resembles the picture of a mammary fibroadenoma.

MARIO A. CASTALLO.

THE INFLUENCE OF MENTAL ATTITUDES IN CHILDBEARING*

FREDERICK W. DERSHIMER, M.D., NEW YORK, N. Y.

(From the Departments of Obstetrics and Gynecology and of Psychiatry, College of Physicians and Surgeons, Columbia University)

THIS paper deals with a study of emotional factors affecting pregnancy and labor. The study began last fall in the clinic of Sloane Hospital and is a cooperative effort of the Departments of Obstetrics and Psychiatry. One object of this work has been to investigate the importance of emotional factors as a cause for difficult labors in physically normal women. It is based on the hypothesis that the emotional attitudes and conflicts of civilized women are an important element in making their labors long and severe. We hope to learn whether this hypothesis is correct and, if it is, what can be done to correct the situation.

An equally important purpose may appear of less interest to the obstetricians. It should not, for our work already suggests that they may be the mental hygienists of the future. For reasons to be discussed later, the period of the first pregnancy appears to offer a unique opportunity for actual mental hygiene. Our second objective has been to investigate this possibility.

The work to date has amounted to but little more than a survey of the situation and no conclusive results are yet available. Professor Cheney suggested, however, that a preliminary report be made now, to include something of the events and reasoning which led to the work being undertaken. He seemed to feel that the obstetricians, as a result of their special studies and experience, would be interested in the conception and gestation of a brain child.

PART I. EMOTIONAL FACTORS IN HARD LABORS

The work began, in a sense, when I was a medical student. We were then informed that primitive women usually had easy labors, civilized women hard ones; and that the difference was due to the better physical condition of the primitive women. This explanation did not satisfy me. In women with normal pelves only the faulty coordination of the muscles of the uterus and perineum interfered with the easy exit of the child. I could not understand why the muscle fibers ahead failed to relax while those behind were contracting, as occurs in normal defecation and other muscular functioning.

*Read, by invitation, before the Section of Obstetrics and Gynecology, The New York Academy of Medicine, May 28, 1935.

I wish to express here my appreciation of the support of Professors Watson and Cheney and the chiefs of the two clinics, Doctors Joseph Draper and Robert McGraw. The nurses and other workers in the clinics have also been thoroughly helpful.

animals supplied the incentive which led to a study of the possible influence of vitamin E as an aid in the correction of certain sterility problems in human subjects. At least some precedent existed in favor of the argument that the clinical exhibition of wheat germ oil, which is the greatest known source of vitamin E, should be of assistance in the restriction of antenatal mortality.

The available data relating to the clinical use of wheat germ oil, although relatively meager, are nevertheless encouraging. For example, Vogt-Möller^{3, 4} in 1931 and 1933 reported favorable results due apparently to the administration of wheat germ oil, in 18 out of 21 cases of habitual abortion. Likewise, Juhász-Schäffer,⁵ also in 1933, mentioned five cases of repeated abortions to whom full-term, normal, living babies were born following the use of the oil. Recently, Watson,⁶ as a consequence of observations made in 65 women who were treated with wheat germ oil, concluded that vitamin E offered promise of being beneficial in the prevention of habitual abortion and probably in the treatment of threatened abortion as well. The present communication is a further report of data which have accrued as a result of the continuation of the last-mentioned investigation.

THE INVESTIGATION

As recorded elsewhere,⁶ the research has been carried on through the cooperation of a number of medical practitioners who prescribed wheat germ oil to patients who presented certain reproductive difficulties. The assistance of those physicians who participated in the work by prescribing wheat germ oil and by supplying the necessary clinical records has been of inestimable value and the gratitude of the authors is hereby expressed.

To date, close to 100 patients have been treated or are being treated with wheat germ oil. Only those cases regarding whom the outcome of the treatment is certain are reported at this time. The patients have been classified into four groups as follows:

Group I: Pregnant women who had experienced two or more spontaneous abortions previous to receiving wheat germ oil treatment (habitual abortion).

Group II: Pregnant women who had experienced one spontaneous abortion previous to receiving wheat germ oil treatment.

Group III: Cases of threatened abortion.

Group IV: Women who sought medical advice on account of failure to become pregnant (sterility group).

The patients included in Groups I and II, with but two exceptions, were pregnant at the time that the treatment with wheat germ oil was started. The purpose of the treatment was to favor the continuation of the pregnancies. The patients in Group III received the oil only after

Eventually, after I entered psychiatry and learned of the power of the emotions to effect bodily changes, I began to suspect emotion as the cause; the hypothesis already stated began to formulate itself. I then found myself in need of some criterion by which to judge it, something paralleling Koch's postulate in bacteriology. No such thing existed, so I finally invented one. I decided that even tentative acceptance of the hypothesis as a basis for research required evidence to answer at least two questions:

Question 1. Have emotions power to cause the incoordination of muscular action which seems to be the cause of prolonged, severe and painful labors in physically normal civilized women?

Cannon¹ shows that acute emotional disturbances are capable of causing various profound bodily changes in cats and dogs. Of particular interest here are the effects of such disturbances on unstriated muscle, the type found in the uterus. Embarrassment causes a relaxation of the circular fibers of the arterioles, resulting in blushing. Fear may cause contraction with blanching of the skin. Both fear and rage completely inhibit the movements of the gastrointestinal tract with the result that the normal forward movement of the food is completely stopped.

Clinical observations and the results of psychotherapy seem to prove, in cases of spastic constipation, that the emotional state of the patient is the cause of spasticity and this, in turn, prevents the normal forward progress of the feces. The same effect on the unstriated muscles involved in labor would prolong it and make it more difficult. Clinical observations and the results of psychotherapy seem to prove that many cases of dysmenorrhea are due to chronic emotional disturbances. Dysmenorrhea is directly analogous to the early phase of labor.

With regard to striped muscle, it is common knowledge that fear in some individuals causes spasm. Such persons become "stiff with fear" and cannot move. The same effect, to a lesser degree, is observed in severe self-consciousness which prevents the normal relaxation of opposing muscle groups and results in jerky, awkward movements such as are common in young, shy adolescents. An example more pertinent to our subject has been found in certain women in whom the emotional attitude toward coitus causes a spasm of the sphincter muscle of the vagina which makes the passage of the penis very difficult, painful, or even impossible. A similar spasm of all the voluntary muscles which can resist the outward passage of the infant could be an important factor in increasing the severity of labor.

Another general fact seems deserving of mention. All other physiologic functions such as eating, coitus, defecation, and so on, are naturally pleasant and easy. Most of them, however, are made definitely unpleasant and disgusting; the usual ease with which they naturally occur

curing abortions, and in one of these a definite toxic state, associated with marked albuminuria, was present, which complication contributed probably to the otherwise unexpected outcome of the pregnancy. No explanation is offered for the failures in the other four cases in this group who aborted.

One Previous Abortion.—In 9 of the 11 wheat-germ-oil-treated patients, each of whom had experienced but a single previous spontaneous abortion, the birth of healthy living children ensued. In one instance, abortion took place a short time after the use of the oil was commenced and in another, miscarriage occurred in spite of adequate treatment with a preparation of wheat germ oil. It was observed that several of the patients exhibited signs of threatening abortion but with the exception of the instances noted, abortions did not follow.

Threatened Abortion.—Nineteen patients were treated for the symptoms of threatened abortion, the majority after bleeding had begun. In 13 of these, the symptoms subsided and the pregnancies continued uninterruptedly to terminate in natural deliveries, but in six cases the abortions became inevitable.

Infecundity.—Fifteen nonpregnant women were given wheat germ oil with a view to facilitating impregnation. Six of these had never conceived and therefore constituted examples of primary sterility. The remainder had been pregnant at least once, thus falling in the class of so-called secondary sterility. Eight had had one or more abortions but only two of the women had given birth to living children. Pregnancy did not ensue in any of the patients in this group.

Table I is a summary of the results observed following wheat germ oil therapy in the various abnormalities as noted. These findings are in agreement with the opinion of Vogt-Möller⁴ regarding the favorable

TABLE I. SUMMARY OF RESULTS OF WHEAT GERM OIL THERAPY

GROUP	CONDITION	NO. OF CASES	SUCCESSES	FAILURES
<i>1. Present Series</i>				
I	Two or more abortions (habitual abortion)	35	25	10
II	One previous abortion	11	9	2
III	Threatened abortion	19	13	6
IV	Sterility	15	0	15
<i>2. Vogt-Möller^{3, 4} (1931 and 1933)</i>				
I	Two or more abortions (habitual abortion)	21	18	3
II	Sterility	4	2	2
<i>3. Juhász-Schäffer⁵ (1934)</i>				
I	Two or more abortions (habitual abortion)	5	5	0

effects of wheat germ oil therapy, especially with reference to the prevention of habitual abortion. Moreover, judging from the records presented, it is possible that the treatment may be beneficial also in some cases of threatened abortion. The successful results in these conditions, namely habitual and threatened abortion, are in the neighborhood of 75 per cent. Incidentally, it is of interest to mention that this was the proportion of successes reported by Falls and his associates⁷ in the treatment of the same abnormalities with progesterin.

ment prohibiting anesthesia in labor when Queen Victoria interfered. We are likely to think that such beliefs have now disappeared because they are seldom discussed, but investigation shows that they are extant and still very powerful.

8. *Resentment*.—In some cases resentment against the husband, or nature, has been evident. The mother had not wished to become pregnant at that time, or circumstances which developed later made it appear unfortunate, as in the case of a woman whose husband was found to have a serious illness shortly after pregnancy began.

These emotional reactions, usual in civilized women, either do not exist at all or they are of slight importance in primitive women. There is, therefore, a great difference between the emotional attitudes of civilized and primitive women with regard to labor, because pregnancy represents to the civilized woman a complete and permanent change in status.

It may be noted that most of the emotional reactions mentioned would occur with greater intensity in reference to the first labor, which suggests a possible reason why first labors are commonly longer and more difficult. In view of these facts, the hypothesis seemed worthy of further investigation.

TREATMENT OF FEARS RELATING TO LABOR

A practical point with regard to the fears previously mentioned: In many cases they are covered with varying degrees of euphoria. In the next group we find them appearing as fears of the labor itself. In obstetric practice they would, ordinarily, be treated with reassurance regarding the outcome of the labor. Such treatment might not touch the real cause of the fears. It might, instead, tend to cover them more thoroughly than ever and so be worse than no treatment at all. Adequate treatment is possible only after the real meanings of the fears have been elicited. Diagnosis is essential in treating fear just as it is in treating physical disorders.

One example will make this clear. The patient had said she feared labor. Discussion revealed that she was in conflict over assuming the responsibilities of motherhood. She feared the ordeal of labor far less than she did its successful outcome. But she felt that a prospective mother should not entertain any thoughts and feelings which were in conflict with the traditional belief that children are an ineffable blessing. She had, therefore, repressed her feeling of rebellion from her consciousness. Further discussion was followed by a realization that while motherhood had its trials, there were also compensations and, following this, she seemed less fearful and more content. Reassurance might have given temporary relief, just as morphine relieves pain. It would not have had a beneficial effect on the cause and might have had an adverse effect.

PART II. PREVENTION OF MENTAL DISEASE

Psychiatrists working with children have recognized for some years that many of the mental conditions from which their patients suffered were caused by emotional disturbances in the home. These, in turn, ap-

REFERENCES

- (1) *Evans, H. M., and Bishop, K. S.*: Science 56: 650, 1922 and Am. J. Physiol. 63: 396, 1922-1923. (2) *Sure, B.*: J. Biol. Chem. 58: 693, 1923-1924. (3) *Vogt-Möller, P.*: Lancet 2: 182, 1931. (4) *Vogt-Möller, P.*: Acta. Obst. et Gynec. Scandinav. 13: 219, 1933. (5) *Juhász-Schäffer, A.*: Ergebn. d. inner. Med. u. Kinderh. 45: 129, 1933. (6) *Watson, E. M.*: Canad. M. A. J., February, 1936. (7) *Krohn, L., Falls, F. H., and Lackner, J. E.*: AM. J. OBST. & GYNEC. 29: 198, 1935.

DISCUSSION

DR. ROBERT A. ROSS, DURHAM, N. C.—Sterility and abortion in avitaminosis and certain malnutritations are notorious facts. Such a condition is found to some extent in profound diabetes, whereas persons at rest, as during tuberculosis cures, are famed for performance and fecundity. It seems safe to say that vitamin A probably has more to do with conception than E, but it is worth while to consider the whole row of vitamins in approaching this problem.

Our attention was especially directed to this phase in investigating the pellagrins in North Carolina in the hope of throwing light on our very definite pregnancy toxemia problem. We found pregnancy rare in these individuals. They had diets poor in every vitamin except E. Our conclusions indicate that several factors are responsible: the general avitaminosis, the associated general ulceration—though mild in the vaginal tract—of all the mucous membranes, the fact that most of the patients were definitely sick, and that the diet includes hog lard which in all probability is rancid.

When we read the statement in Sherman's book that "lack of vitamin A causes failure of reproduction through interfering with ovulation, whereas lack of vitamin E interferes with placental function," the above observation, in regard to sterility and the author's splendid results in abortions, is significant. And when we consider Falls' and others' series of abortions treated with progesterin, there is another thought and analogy brought to light. Now that Allen has given us the formula of progesterin, and Butenandt, Ruzicka and Slotta have synthesized the product—even from soy beans and coal—we may find a hook-up between these endogenous and exogenous products. This series also reminds us that there is in all likelihood a minimum which is reached, beyond which no agent is effective.

I would like to ask Dr. Tew his feeling in regard to the other vitamins, especially A, and in view of evidence that lack of E is more destructive in the male, if any measures should be taken in regard to the husband?

DR. WILLIAM B. HENDRY, TORONTO, CANADA.—The problem of sterility, threatened abortion, and neonatal death is one which presents all sorts of difficulties. It appears that it is possibly a deficiency problem. Some years ago DeLee commented upon the fact that in the Midwest there was a good deal of septic abortion, contrasting this with the condition in the Coastal States where there was none. He put it down to a deficiency of iodine and suggested the use of iodized milk in pregnancy. What his results were I have not yet heard.

Then, too, we have had Litzenberg's observations with regard to the deficiency in thyroid in connection with sterility. In the course of his remarks he reported a case of a woman who could space her pregnancies by the administration of thyroid.

Later on we had the work of Collip in connection with an anterior pituitary-like substance which is found in human placentas. This substance we have used on several occasions with the idea of continuing a pregnancy where abortion has been threatened, and it has given very favorable results. Progesterin has also been used with considerable success.

The experiments of Dr. Tew, I think, are worthy of consideration because where you get 75 per cent successful treatments with regard to any therapeutic measure it is well worth considering.

One intelligent woman had previously recognized this characteristic of pregnant women and had resolved that when she became pregnant she would not take advantage of the situation. Up to about two weeks before labor she succeeded. Then, for about a week, she demanded from her husband and sister-in-law (a nurse who had come to stay with her through the labor), all the attentions usually given a seriously ill person, a small child, or a queen. She was fully aware at the time, she reported afterward, that her attitude and demands were utterly unjustified, and yet she could not stop herself.

Of attitudes and beliefs known to have deleterious effects on children, the following were among those elicited: Most of the women were over-emphasizing the importance of what they did, as if it were they, and not nature, which was producing the child. It is not the policy at Sloane, in the case of normal women, to lay down any strict regime. Many of the women had expected this and felt that if they failed to take special care of themselves, ill effects would be visited upon the children. They believed, in brief, that both the pregnancy and labor should be a martyrdom. But they also expected a reward for undergoing this. They believed it would confer on them a special kind of wisdom with regard to their own children, a mystic sort of knowledge transcending any which might be learned by those who had not been initiated in childbearing. One sensible, former school-teacher admitted, after discussion, that this was a superstitious belief which had nothing to do with reality. She added that she had seen plenty of ignorant mothers who mishandled their children badly but still adhered to this belief regarding themselves. Most of the women, in varying degrees, believed that both their husbands and children would be eternally indebted to them and expected perpetual future devotion because of "what mothers go through" in bearing children. This set of beliefs is a basic cause of later difficulties, because it leads mothers to mistreat their children and make impossible demands on both them and the husband.

Another related belief gave rise to fear and conflict in some cases. Some of the women disclosed strong fears of abnormalities, mental or physical, in the forthcoming child. These were based on the belief that previous acts of the woman were sinful and would be punished by such visitations. One of the case reports which follow deals with a case of this kind, and the same element entered into the other case.

The women supplied convincing evidence that society in general makes every possible effort to prevent the pregnant woman from accepting pregnancy and labor as a natural physiologic function. The same amount of attention to eating would make most of us have nervous indigestion. Columnists and fiction writers make much of their "blessed events." Mothers, husbands, other relatives, and friends do their best to make the woman feel that she is going through an unusual and dangerous experience. Even strangers, in some of the cases, had gone out of their way to tell the woman some terrifying story of childbirth. All of which tends to make the woman feel important and different from ordinary

group. Of the total number of cases then but 26 real cancers of the cervical stump remained. The study was illuminating and showed clearly the necessity for a careful investigation into all the possible facts in the study of cervical stump cancer.

CARCINOMA OF THE CERVIX PRESENT AT THE TIME OF THE HYSTERECTOMY

The first group to be considered was composed of those cases in which the cancer occurred within a year of the original operation. There were 23 such cases. There were 13 in which the symptoms which led to the first operation were continuous but the discovery and treatment of the cervix was immediate in only five. In the other cases the tumor was treated within six months in 10, and between seven months and one year in 8. It was surprising to note that in three cases in which the tumor was present at the first operation and the pathologic report positive, treatment of the stump cancer was delayed for a year. Seven, or 30.4 per cent, were nulliparous, and 8 had had but one child or none. In 12 cases fibroids were present, and it was assumed that the operation was done to remove the fibroid tumor and that the cervical condition was overlooked. In only four was the combination of no children and fibroids present. Here the surgeon probably considered that because the patient had no children and because there was a fibroid, cancer was not present. Eight cases had passed the menopause, and this is another possible reason for not discovering the cervical cancer in the presence of fibroids, as the bleeding was erroneously considered in all probability as due to them.

ADENOCARCINOMA FOLLOWING SUBTOTAL HYSTERECTOMY FOR ADENOCARCINOMA OF THE BODY OF THE UTERUS

The second group to be discussed is that of adenocarcinoma of the body of the uterus with later recurrence of the disease in the retained cervix. *This group of 9 cases stands as a monument to a surgical procedure that cannot be too severely condemned.* It is common knowledge, or should be, that there is a chain of lymphatics running from the body to the cervix in the wall of the uterus and that body cancers do grow into the endocervix by direct continuity. Six of these patients were single and of the 3 others 2 had but 1 child, and 1 had had 1 miscarriage. In 2 the symptoms for which the operation was done were continuous and in one the symptoms recurred within weeks, in 2 others within months, and in 4, within years. One of these later cases did not have a recurrence of the tumor for six years. Four of these recurrent cases were regarded as favorable and 5 as unfavorable for treatment. One patient who had an adenocarcinoma is living with disease ten years after the original operation without any treatment of the cervical stump recurrence, although it has been known to be present for four years. Another with adenocarcinoma is living with disease for four years and three months following radium in the cervical stump. In 2 instances patients

thus committed, they express this doubt in frigidity as if they wanted to maintain a ready exit from the marriage in case their fears and doubts should later be confirmed.

A fourth cause seemed to be more simple, the belief that conception could not occur without an orgasm. This cause was operative in at least one case in which the woman had wanted to postpone pregnancy. Another patient showed that the belief was derived from her mother. This prospective grandmother argued with the daughter that she must have had an orgasm, insisting that otherwise pregnancy could not have occurred.

CASE REPORTS

CASE 1.—A quiet, somewhat introverted woman of twenty-eight who had not talked very freely. She had admitted some fear of labor but seemed unable to discuss this. About two weeks before labor was due she came in complaining of numbness in her right hand and particularly in her right middle finger. No physical cause for this could be discovered and the possibility of an hysteria arose. She was asked to consider the finger for a few minutes and tell me anything which entered her mind. At this she showed signs of extreme embarrassment but would say nothing for some time. She finally admitted that she had masturbated during the latter part of the four-year engagement. She felt that this was a terrible thing to have done and believed it might have damaged her internal organs. This, she feared, would have some ill effect on her child.

The subject was discussed during the two interviews previous to her labor. In the second, the importance of clearing up her false beliefs on the subject was mentioned. She was told that without this she would be very likely to be oversuspicious of the child and always expecting him or her to indulge in improper sexual activities. She agreed that this was correct. She had been watching the small son of a friend a few days earlier. When this boy put his hands anywhere near his genitals, she felt that the mother was very remiss for not stopping him. She said she knew this was foolish but had been unable to change the feeling that the boy was a masturbator. Psychotherapy appeared to result in a partial cure.

Such an attitude persisting in a mother is known to have had effects on the child, and her own reactions were so extreme that they appeared capable, if unrelieved, of causing serious mental disease in her.

CASE 2.—The patient was formerly a teacher in a small town in New England and had been married but a short time when the pregnancy occurred. On her first visit she had insisted that her marriage was perfect and wonderful. She later admitted a failure to enjoy coitus. Discussion disclosed some degree of the feeling that nice women should not enjoy such things, together with a greater degree of doubt regarding the wisdom of her marriage. She had not yet made any friends in New York, and she missed her work and the pleasures of rural life she had previously enjoyed. In the effort to make herself believe the marriage perfect she had not allowed herself to think about these things and, as a result, was acting in coitus as if she were still unmarried. She was asked to consider whether she felt, after weighing the one against the other, that she had gained more than she had lost by the marriage and decided she had gained. She reported on the following visit that the frigidity had disappeared.

She brought up a question of her own on this visit. She reported that she and her husband had agreed before marriage that the only way to have a satisfactory child was by developing a mental image of the child in advance and then carefully holding this image while indulging in coitus to cause its conception. But concep-

sufficient. It does remove the endocervix but leaves the more dangerous squamous part of the cervical epithelium and frequently the most dangerous area, that of the junction of the squamous portion with the glandular endocervical portion. No figures are available to substantiate or condemn the method but as an absolute preventive knowledge of what is left behind seems sufficient proof of its ineffectiveness. In 8 patients both ovaries were removed and most of these developed their tumor in the cervix some time after the operation. Many were in the menopause age at the time of the removal of the ovaries, but one being under forty-two years. The cancer in the stump developed from 6 to 23 years after removal of the ovaries. Eleven patients, or 46.1 per cent, had had the menopause before the cervical cancer developed. This is higher than the usual percentage of the menopause in most series of cervical cancers. The significances of castration or the menopause are hard to correlate, but they add another factor to nonfertility or "unused uterus" and fibroids. The presence of five ovarian cysts of a nonmalignant type also must be of some importance when grouped with the other findings.

The symptoms of a malignant tumor in the cervical stump began in many different yearly intervals from the time of the original operation. One occurred at the end of one year and 2 in two years, and all 3 of these could be properly excluded from true cancer of the stump as the tumor was probably present before the hysterectomy was done. But an arbitrary limit of one year was set and must therefore be lived up to. Between four and six years 12 patients developed cancer, at eight and nine years, 1 each, and from eleven to twenty-three years, 9.

The extent of disease shows that 7 were in the A and B, or operable, groups of the American College of Surgeons Classification and that 19 were in the inoperable, or C and D, groups. Sixteen tumors were of the epidermoid variety and 4, or 15 per cent, adenocarcinoma (a high percentage of this type of cervical tumor). This latter figure might indicate that adenocarcinoma of the body was present at the original operation a much more likely explanation than that this type of tumor is more common in retained stump cases. However, adenocarcinoma did develop in two patients who had no children, and this type of tumor might be more likely in undamaged cervixes than the epidermoid variety. In 6 instances the type of tumor was not classified, the pathologic report simply calling the tumor carcinoma.

The treatment consisted of radium in 10 instances, with 2 patients alive for one year and eight months and four years, respectively. Radium and x-ray treatment in combination were used in 8 cases and 5 patients are still alive, 4 very recent ones (too recent to count) and 1 with disease for two years. There were 2 cauterizations of the cervix (one with the Percy cautery) and both are dead. One abdominal cervicectomy of the Wertheim type was done and the patient has succumbed, and of the 2 vaginal cervicectomies one is alive without disease

the children were reflecting; that the greatest need in such a situation was for psychiatric treatment of the parents. The alibis usually advanced by parents were discussed and every effort made to discredit them as common real causes. Available information regarding the natural tendency of children to behave well, if permitted to do so, was also discussed in the effort to relieve the women of the feeling that they were about to enter upon a task of making naturally bad creatures over into good ones. Information regarding places to get help for either physical or mental disturbances of the children was given on request. The immediate response to this sort of teaching was apparently good. The women showed considerable interest and some of them seemed to find relief for some of their worries about child raising. We believe, as a result, that we have laid groundwork which may prevent them from allowing disturbances in the home to develop to a point where they are as hard to treat as those which now commonly come to the psychiatric clinics. In some cases we may have relieved conflicts which might have become serious. This seemed true in both the cases reported.

CONCLUSIONS

1. The wealth of material elicited seems to indicate the need for more work along similar lines.
2. The women should be followed through their labors by the psychiatrist.
3. More husbands and other relatives should be interviewed either at the clinic or perhaps in their homes by a psychiatric social worker.
4. Machinery should be set up for following the families over a period of years for two purposes: (a) To evaluate the results of preventive measures, and (b) to offer additional aid if it is indicated.

REFERENCES

- (1) Cannon, *Walter B.*: Bodily Changes in Pain, Hunger, Fear, and Rage. An Account of Recent Researches Into the Functions of Emotional Excitement. New York, 1920, D. Appleton & Co. (2) Read, *Grantly Dick*: Natural Childbirth. London, 1933, William Heinemann.

30 EAST FORTIETH STREET

Tata, Giuseppe: The Bactericidal Power of Blood Serum, *Riv. ital. di ginecol.* 17: 533, 1935.

Based upon the study of 29 pregnant tuberculous women from the Umberto I Sanitarium of Rome, the author observed that contrary to what is verified in those affected with pulmonary tuberculosis without pregnancy, the bactericidal power of the blood serum against Koch's bacillus is constantly and noticeably diminished in pregnant patients.

Despite the damaging effect of pregnancy upon the system of immunity in the tuberculous patient, the author infers from his experience that when pregnant women enjoy the benefits of treatment in a sanatorium, a majority of them will go to term without further damage.

AUGUST F. D'ARO.

TABLE I. SUPRAVAGINAL VS. TOTAL HYSTERECTOMY

	TOTAL	MORTALITY	SUPRA-VAGINAL	MORTALITY
I Masson (Mayo Clinic) 1926	229	1.3	217	1.8
II Fullerton and Faulkner	1078	4.1	609	4.4
III Mayo Clinic—1928*	219	0.45	251	0.79
IV Essen-Möller†	117	6.9	799	2.0
V Graves			1399	1.57
VI Bartlett and Simmons‡	137	5.1	2733	1.7
VII Burch and Burch			166	4.2
VIII Massachusetts General Hospital	224	4.4	1771	2.9

*Group III from the Mayo Clinic are benign lesions.

†Group IV Essen-Möller's cases are fibroids.

‡Group VI from the Free Hospital for Women in Brookline are benign lesions except for leiomyosarcoma.

There seems to be nearly unanimity of opinion regarding the hazards of total as compared to supravaginal hysterectomy. A few quotations from various writers upon this subject show the feeling better than the figures because tables and figures (see Table I) do not always tell the whole story. For instance, many surgeons do total hysterectomies only when they consider the patient a suitable risk, and the supravaginal operation when the risk is great and a quick operation is necessary. Serious pelvic inflammatory cases and necrotic tumors, cases carrying a high mortality are much more likely to be operated upon by the supravaginal method than by the total unless the patient is an exceptional risk. In many cases nulliparas with normal cervixes are operated upon by the supravaginal method. Figures show very little difference in mortality between the two operations but figures do not tell the whole story of the types of cases included in each series. The table's importance is the comparison between various surgeons' figures rather than the difference in mortality between the two operations.

Fullerton and Faulkner, writing on the subject in 1930, state that "although it is true that malignant conditions may develop later in the cervical stump, the risk is certainly no greater, than such disease occurring in the cervix of any woman, if as great (see page 364). The probability of such occurrence is not to be compared with the added danger and risk of the more severe operation; so that, in our opinion, the cervix, unless the seat of an intractable resistant chronic infection, or suggestive of cancer, should be treated conservatively and not removed at operation. Trachelorrhaphy, cauterization, or even low amputation when indicated, will nearly always leave the cervix in a satisfactory condition. It is true that in a few cases a troublesome leucorrhea may persist, but this will almost invariably yield to cautery treatment." This was written in spite of the fact that their mortality figures for total hysterectomy are better than their figures for the supravaginal operation. Their postoperative complications, however, are enlightening: 18 fistulas (only 3 operations for cancer) among the total hysterectomies and none for the subtotal type, cystitis twice as common, and hemorrhage more common.

Of 731 internal podalic versions performed at the Boston Lying-In Hospital during the period under investigation, 12 resulted in rupture of the uterus, an incidence of 1 to 61. A considerable number of the

TABLE I. RECORD OF PARITY

Primiparas	2		
Multiparas	24	{ 3 or more pregnancies	19
		{ 5 or more pregnancies	16
		{ 7 or more pregnancies	10
		{ 8 or more pregnancies	5
		{ 10 or more pregnancies	2

TABLE II. RECORD OF PRESENTATION, POSITION, ENGAGEMENT, AND CERVICAL DILATATION IN 17 CASES OF TRAUMATIC RUPTURE

PRESENTATION		VERTEX PRESENTATIONS				DILATATION OF CERVIX	
		POSITION		ENGAGEMENT			
Vertex	6	L.O.A.	3	Floating	1	Complete	9
Transverse	5	R.O.P.	2	High	4	Incomplete	8
Breech	2	L.O.P.	1	Mid	1		
Nonviable	2			Low	0		
Face	1						
Brow	1						

TABLE III. DELIVERY RECORD IN 17 CASES OF TRAUMATIC RUPTURE

INDICATION FOR DELIVERY		ATTEMPTED METHODS		ULTIMATE TYPE OF DELIVERY	
Lack of progress	5	High forceps	3	Internal podalic ver-	12
Fetal distress	3	Craniotomy	3	sion and extrac-	
Maternal distress	2	Pomeroy maneuver	1	tion	
Prolapse of cord	2	Decapitation	1	*Accouchement forcé	2
Inevitable miscarriage	2	Manual rotation of	1	and extraction	
Prolapse of arm	1	head		†Braxton Hicks version	1
Placenta previa	1			Breech extraction	1
				‡Spontaneous delivery	1

*Inevitable miscarriages.

†Placenta previa.

‡Rupture as a result of manual extraction of placenta (Case 10).

TABLE IV. LABOR RECORD IN CASES DELIVERED BY VERSION

DURATION OF LABOR		DURATION OF RUPTURE OF MEMBRANE	
PRIMIPARAS	MULTIPARAS	PRIMIPARAS	MULTIPARAS
51 hours	90 hours	12 hours	65 hours
	25 hours		49 hours
	24 hours		9 hours
	17 hours		7½ hours
	15 hours		3½ hours
	14 hours		2½ hours
	12 hours		2 hours
	7½ hours		1 hour
	7 hours		
	6 hours		
	2 hours		

versions were performed for delivery of twins and for extraction of premature or nonviable infants, which means that the likelihood of rupture as a result of version at term in a desperate situation is comparatively great.

0.73 per cent, is less than one-half of the percentage incidence of cancer of the cervix. In other words cancer of the retained cervix is not more likely after subtotal hysterectomy but from our figures one-half as likely as in women as a whole! In a ten-year series previously studied by the same method at the same hospital, the incidence of cancer of the cervical stump was found to be 0.9 per cent, only slightly higher. For the advocates of total hysterectomy to maintain their position it would be necessary for them to show not over a 0.73 per cent difference in mortality between subtotal and total hysterectomy. This *might* be accomplished by an operator well trained in this type of surgery, but to advocate total hysterectomy to all surgeons throughout the country in all patients to prevent the occurrence of cancer in the cervical stump would be the cause of far more deaths in an attempt to prevent cancer than would die of cancer itself. It is also obvious that total hysterectomy cannot be advocated in only special groups of cases, but it must be advocated in *all*, even those who have had no children.

SUMMARY

The most important considerations are the large percentage of nulliparas developing cancer of the retained cervix, the large percentage of cases with fibroids in the series, and the very small percentage of occurrence of this cancer as compared to the general impression in the literature of today. Conservative surgery should be the rule, and the life of the patient the most important consideration.

There is no doubt, and no one will deny it, that total hysterectomy is a more formidable and more serious operation than simple subtotal removal of the uterus. The morbidity, the chance of injuring the ureters and bladder, the possibility of vaginal prolapse and the foreshortening of the vagina in the young married woman all are against this operation as a routine.

The proper method of attack in cases needing hysterectomy is to carefully inspect the cervix in lithotomy position, and to curette at least the endocervix in the young and the whole uterus in the old. If the cervix looks suspicious it should be repaired, amputated, or biopsied, and no further operation should be done until a frozen section has been made, but if no pathologist is available for a frozen section, it is better to wait three or four days for a laboratory report and the presence or absence of cancer determined. The curettings should, of course, be subjected to examination. If cancer is present the proper procedure can be outlined, such as total hysterectomy, total vaginal hysterectomy, or radium. If no cancer is present a subtotal removal of the uterus can be done with ease of mind and the knowledge that the very best treatment had been outlined for the patient. A diseased cervix should never be left untreated; it should be removed or repaired by whatever means the individual surgeon is best fitted to do it, either by amputation, repair,

One intelligent woman had previously recognized this characteristic of pregnant women and had resolved that when she became pregnant she would not take advantage of the situation. Up to about two weeks before labor she succeeded. Then, for about a week, she demanded from her husband and sister-in-law (a nurse who had come to stay with her through the labor), all the attentions usually given a seriously ill person, a small child, or a queen. She was fully aware at the time, she reported afterward, that her attitude and demands were utterly unjustified, and yet she could not stop herself.

Of attitudes and beliefs known to have deleterious effects on children, the following were among those elicited: Most of the women were over-emphasizing the importance of what they did, as if it were they, and not nature, which was producing the child. It is not the policy at Sloane, in the case of normal women, to lay down any strict regime. Many of the women had expected this and felt that if they failed to take special care of themselves, ill effects would be visited upon the children. They believed, in brief, that both the pregnancy and labor should be a martyrdom. But they also expected a reward for undergoing this. They believed it would confer on them a special kind of wisdom with regard to their own children, a mystic sort of knowledge transcending any which might be learned by those who had not been initiated in childbearing. One sensible, former school-teacher admitted, after discussion, that this was a superstitious belief which had nothing to do with reality. She added that she had seen plenty of ignorant mothers who mishandled their children badly but still adhered to this belief regarding themselves. Most of the women, in varying degrees, believed that both their husbands and children would be eternally indebted to them and expected perpetual future devotion because of "what mothers go through" in bearing children. This set of beliefs is a basic cause of later difficulties, because it leads mothers to mistreat their children and make impossible demands on both them and the husband.

Another related belief gave rise to fear and conflict in some cases. Some of the women disclosed strong fears of abnormalities, mental or physical, in the forthcoming child. These were based on the belief that previous acts of the woman were sinful and would be punished by such visitations. One of the case reports which follow deals with a case of this kind, and the same element entered into the other case.

The women supplied convincing evidence that society in general makes every possible effort to prevent the pregnant woman from accepting pregnancy and labor as a natural physiologic function. The same amount of attention to eating would make most of us have nervous indigestion. Columnists and fiction writers make much of their "blessed events." Mothers, husbands, other relatives, and friends do their best to make the woman feel that she is going through an unusual and dangerous experience. Even strangers, in some of the cases, had gone out of their way to tell the woman some terrifying story of childbirth. All of which tends to make the woman feel important and different from ordinary

Society Transactions

AMERICAN ASSOCIATION OF OBSTETRICIANS, GYNECOLOGISTS AND ABDOMINAL SURGEONS

Forty-Eighth Annual Meeting, Skytop Lodge, Pa.

September 16 to 18, 1935

The President, Dr. Marvin P. Rucker, of Richmond, Va., in the Chair.

The following papers were presented at the various sessions and except as noted are published in the current issue of the JOURNAL.

Fibrosis of the Placenta. Dr. Thaddeus L. Montgomery, Philadelphia, Pa. (For original article, see page 253.)

Direct Heat in the Treatment of Cervix Uteri. Dr. B. R. McClellan, Xenia, Ohio. (For original article, see current volume of the Association's Transactions.)

Mucocele of the Vermiform Appendix. Dr. Walter T. Danureuther, New York, N. Y. (For original article, see page 342.)

The Reduction of Mortality in Ectopic Gestation. Dr. Charles A. Gordon, Brooklyn, N. Y. (For original article, see page 280.)

Intraspinal Alcohol Injections and Sympathectomy for Pain Associated With Carcinoma of the Cervix. Drs. J. P. Greenhill and Herbert E. Schmditz, Chicago, Ill. (For original article, see page 290.)

The Treatment of Acute Pancreatic Necrosis. Dr. L. F. Smead, Toledo, Ohio. (For original article, see current volume of the Association's Transactions.)

Clinical and Pathologic Differentiation of Certain Special Ovarian Tumors. Drs. Emil Novak and L. A. Gray, Baltimore, Md. (For original article, see page 213.)

Premature Separation of the Placenta Encountered in Private Practice. Dr. R. F. DeNormandie, Boston, Mass. (For original article, see page 325.)

Vesicovaginal Fistula. Dr. L. E. Phaneuf, Boston, Mass. (For original article, see page 316.)

Cautery Excision of the Carcinomatous Breast. Dr. James F. Percy, Los Angeles, Calif. (To be published in the current volume of the Association's Transactions.)

Wheat Germ Oil (Vitamin E) Therapy in Obstetrics. Drs. E. M. Watson and W. P. Tew, London, Ont., Canada. (For original article, see page 352.)

A Brief History of Obstetrics and Gynecology in Virginia. (Presidential Address.) Dr. M. P. Rucker, Richmond, Va. (For original article, see page 187.)

Massive Blood Transfusions During Abdominal Operations. Drs. B. Z. Cashman and M. H. Baker, Pittsburgh, Pa. (For original article, see page 240.)

Pelvic Inclination. Drs. A. Y. P. Garuett and J. B. Jacobs, Washington, D. C. (To appear in the March issue of the JOURNAL.)

Uterine Bleeding. Drs. A. J. Rongy, A. Tamis, and H. Gordon, New York, N. Y. (For original article, see page 300.)

thus committed, they express this doubt in frigidity as if they wanted to maintain a ready exit from the marriage in case their fears and doubts should later be confirmed.

A fourth cause seemed to be more simple, the belief that conception could not occur without an orgasm. This cause was operative in at least one case in which the woman had wanted to postpone pregnancy. Another patient showed that the belief was derived from her mother. This prospective grandmother argued with the daughter that she must have had an orgasm, insisting that otherwise pregnancy could not have occurred.

CASE REPORTS

CASE 1.—A quiet, somewhat introverted woman of twenty-eight who had not talked very freely. She had admitted some fear of labor but seemed unable to discuss this. About two weeks before labor was due she came in complaining of numbness in her right hand and particularly in her right middle finger. No physical cause for this could be discovered and the possibility of an hysteria arose. She was asked to consider the finger for a few minutes and tell me anything which entered her mind. At this she showed signs of extreme embarrassment but would say nothing for some time. She finally admitted that she had masturbated during the latter part of the four-year engagement. She felt that this was a terrible thing to have done and believed it might have damaged her internal organs. This, she feared, would have some ill effect on her child.

The subject was discussed during the two interviews previous to her labor. In the second, the importance of clearing up her false beliefs on the subject was mentioned. She was told that without this she would be very likely to be oversuspicious of the child and always expecting him or her to indulge in improper sexual activities. She agreed that this was correct. She had been watching the small son of a friend a few days earlier. When this boy put his hands anywhere near his genitals, she felt that the mother was very remiss for not stopping him. She said she knew this was foolish but had been unable to change the feeling that the boy was a masturbator. Psychotherapy appeared to result in a partial cure.

Such an attitude persisting in a mother is known to have bad effects on the child, and her own reactions were so extreme that they appeared capable, if unrelieved, of causing serious mental disease in her.

CASE 2.—The patient was formerly a teacher in a small town in New England and had been married but a short time when the pregnancy occurred. On her first visit she had insisted that her marriage was perfect and wonderful. She later admitted a failure to enjoy coitus. Discussion disclosed some degree of the feeling that nice women should not enjoy such things, together with a greater degree of doubt regarding the wisdom of her marriage. She had not yet made any friends in New York, and she missed her work and the pleasures of rural life she had previously enjoyed. In the effort to make herself believe the marriage perfect she had not allowed herself to think about these things and, as a result, was acting in coitus as if she were still unmarried. She was asked to consider whether she felt, after weighing the one against the other, that she had gained more than she had lost by the marriage and decided she had gained. She reported on the following visit that the frigidity had disappeared.

She brought up a question of her own on this visit. She reported that she and her husband had agreed before marriage that the only way to have a satisfactory child was by developing a mental image of the child in advance and then carefully holding this image while indulging in coitus to cause its conception. But concep-

the children were reflecting; that the greatest need in such a situation was for psychiatric treatment of the parents. The alibis usually advanced by parents were discussed and every effort made to discredit them as common real causes. Available information regarding the natural tendency of children to behave well, if permitted to do so, was also discussed in the effort to relieve the women of the feeling that they were about to enter upon a task of making naturally bad creatures over into good ones. Information regarding places to get help for either physical or mental disturbances of the children was given on request. The immediate response to this sort of teaching was apparently good. The women showed considerable interest and some of them seemed to find relief for some of their worries about child raising. We believe, as a result, that we have laid groundwork which may prevent them from allowing disturbances in the home to develop to a point where they are as hard to treat as those which now commonly come to the psychiatric clinics. In some cases we may have relieved conflicts which might have become serious. This seemed true in both the cases reported.

CONCLUSIONS

1. The wealth of material elicited seems to indicate the need for more work along similar lines.
2. The women should be followed through their labors by the psychiatrist.
3. More husbands and other relatives should be interviewed either at the clinic or perhaps in their homes by a psychiatric social worker.
4. Machinery should be set up for following the families over a period of years for two purposes: (a) To evaluate the results of preventive measures, and (b) to offer additional aid if it is indicated.

REFERENCES

- (1) Cannon, Walter B.: Bodily Changes in Pain, Hunger, Fear, and Rage. An Account of Recent Researches Into the Functions of Emotional Excitement, New York, 1920, D. Appleton & Co. (2) Read, Grantly Dick: Natural Childbirth, London, 1933, William Heinemann.

29 EAST FORTIETH STREET

Tata, Giuseppe: The Bactericidal Power of Blood Serum, Riv. ital. di ginecol. 17: 533, 1935.

Based upon the study of 29 pregnant tuberculous women from the Umberto I Sanitarium of Rome, the author observed that contrary to what is verified in those affected with pulmonary tuberculosis without pregnancy, the bactericidal power of the blood serum against Koch's bacillus is constantly and noticeably diminished in pregnant patients.

Despite the damaging effect of pregnancy upon the system of immunity in the tuberculous patient, the author infers from his experience that when pregnant women enjoy the benefits of treatment in a sanatorium, a majority of them will go to term without further damage.

AUGUST F. DARO.

American Journal of Obstetrics and Gynecology

VOL. 31

MARCH, 1936

No. 3

IN MEMORIAM

GEORGE GELLHORN

1870—1936

GEORGE GELLHORN, a member of the Advisory Editorial Board of the JOURNAL, died January 25, 1936, at St. Louis. He was born in Breslau, Germany, November 7, 1870, the son of Adolph Gellhorn, merchant, and Rosalie Pincus. He attended the Gymnasium at Ohlau near Breslau, 1876 to 1890 and had his medical degree in 1894 from the University of Würzburg. In 1903 he married Edna Fisehel of St. Louis; his children are George, in business; Walter, assistant professor of administrative law at Columbia; Martha, writer; and Alfred, student of medicine. He served as assistant in clinics at the Universities of Berlin, Jena and Vienna from 1895 to 1899; practiced in St. Louis, Mo., since 1900; was instructor and lecturer in gynecology, Washington University School of Medicine, from 1904 to 1922; Professor of Gynecology and Obstetrics and Director of Department, St. Louis University School of Medicine, 1922 to 1932, and Professor of Clinical Obstetrics and Gynecology at Washington University School of Medicine since 1932. He served as Gynecologist at the Barnard Free Skin and Cancer Hospital, Gynecologist and Obstetrician at St. Luke's and Jewish Hospitals, Associate Gynecologist and Obstetrician at Barnes and St. Louis Maternity Hospitals; Consultant Gynecologist of the Missouri Pacific and St. Louis County Hospitals, and was a member of the American Gynecological Society (President 1931), American Gynecological Club (President 1915), Deutsche Gesellschaft für Gynaekologie until 1934; the American Medical Association, St. Louis Medical Society; Founder and Member of Board of Governors of the American College of Surgeons; Bacon lecturer 1931; Gilliam lecturer 1932.

If one gauge of acclaim is the span of a man—his fullness of life and his versatility of interest—then indeed we hold George Gellhorn high.

Of 731 internal podalic versions performed at the Boston Lying-In Hospital during the period under investigation, 12 resulted in rupture of the uterus, an incidence of 1 to 61. A considerable number of the

TABLE I. RECORD OF PARITY

Primiparas	2		
Multiparas	24	{ 3 or more pregnancies	19
		{ 5 or more pregnancies	16
		{ 7 or more pregnancies	10
		{ 8 or more pregnancies	5
		{ 10 or more pregnancies	2

TABLE II. RECORD OF PRESENTATION, POSITION, ENGAGEMENT, AND CERVICAL DILATATION IN 17 CASES OF TRAUMATIC RUPTURE

PRESENTATION		VERTEX PRESENTATIONS				DILATATION OF CERVIX	
		POSITION		ENGAGEMENT			
Vertex	6	L.O.A.	3	Floating	1	Complete	9
Transverse	5	R.O.P.	2	High	4	Incomplete	8
Breech	2	L.O.P.	1	Mid	1		
Nonviable	2			Low	0		
Face	1						
Brow	1						

TABLE III. DELIVERY RECORD IN 17 CASES OF TRAUMATIC RUPTURE

INDICATION FOR DELIVERY		ATTEMPTED METHODS		ULTIMATE TYPE OF DELIVERY	
Lack of progress	5	High forceps	3	Internal podalic version and extraction	12
Fetal distress	3	Craniotomy	3		
Maternal distress	2	Pomeroy maneuver	1		
Prolapse of cord	2	Decapitation	1	*Accouchement forcé and extraction	2
Inevitable miscarriage	2	Manual rotation of head	1	†Braxton Hicks version	1
Prolapse of arm	1			Breech extraction	1
Placenta previa	1			‡Spontaneous delivery	1

*Inevitable miscarriages.
†Placenta previa.
‡Rupture as a result of manual extraction of placenta (Case 10).

TABLE IV. LABOR RECORD IN CASES DELIVERED BY VERSION

DURATION OF LABOR		DURATION OF RUPTURE OF MEMBRANE	
PRIMIPARAS	MULTIPARAS	PRIMIPARAS	MULTIPARAS
51 hours	90 hours	12 hours	65 hours
	25 hours		49 hours
	24 hours		9 hours
	17 hours		7½ hours
	15 hours		3½ hours
	14 hours		2½ hours
	12 hours		2 hours
	7½ hours		1 hour
	7 hours		
	6 hours		
	2 hours		

versions were performed for delivery of twins and for extraction of premature or nonviable infants, which means that the likelihood of rupture as a result of version at term in a desperate situation is comparatively great.

In the combined activities of obstetrician and gynecologist, Gellhorn did his full share in promoting expertness among the former in order to save women from need of expertness among the latter; of his twenty obstetric papers several relate to the puerperium. One of his devices is a delivery table. His alertness during forty years accelerating the steps of progress in the care of cancer may be gauged by the thirty-four articles among one hundred and thirty titles opposite his name. With Maekenrodt he learned the attack by the heated knife; his experience enabled him to compare, as few here can, the indications for removal by the vagina as against those of the approach through the abdomen; he studied the results from operation versus irradiation, and the combination of the two, and concerning treatment of the parametrium. For the inoperable cervical growth he originated the minimizing of unpleasantness through hardening with acetone.

Gellhorn has been our authority on syphilis among women and his monograph is a classic. In hysterectomy he held that use of the lower route in suitable cases was a subject too little considered in the United States. His is the simplest peritoneal cover for the cervical stump. In anesthesia he made special studies, working at techniques and indications for spinal and local application.

At story telling this comrade had few equals, and competitive good talk he trained at the home table. He was a purist in English, in French, in Latin; a lover of clarity. Learned and modest and many-sided, George Gellhorn has performed a memorable part in setting forward our standards, professional, human and humane.

Robert L. Dickinson.

The Editors of the JOURNAL desire to add their tribute to the foregoing obituary, in which are expressed so well the outstanding attainments and qualities of George Gellhorn by a close friend and associate of many years' standing. Dr. Gellhorn took an active and intimate part in the founding and organization of the JOURNAL; he was a member of the Advisory Editorial Board from its establishment, ever solicitous of its welfare, a frequent contributor to its pages, and a highly valued associate. We rejoice in his having been with us—we regret, as do a host of friends and colleagues, his untimely death.

George W. Kosmak.

Hugo Ehrenfest.

used without success and the operator discovered a contraction ring. An attempt was made to stretch the contraction ring manually. Internal podalic version was then chosen as the means of delivery, but this was most difficult. The cord was severed during the process of turning the baby, and it was necessary to do a craniotomy in order to deliver the after-coming head which, after delivery, was found to be hydrocephalic. There was an extensive laceration of the cervix, extending into the vaginal vault and broad ligament. This was sutured per vaginum, but the patient succumbed in five days to peritonitis and bronchopneumonia.

CASE 5.—(Hospital No. 27937.) 1921. Mrs. H., aged twenty-six years, para i, was sent to the hospital by the family physician who had performed four vaginal examinations during labor without the use of gloves and had twice attempted to deliver her. She had been in labor fifty-one hours. The uterus was of boardlike consistency on entry, and pus was coming from the vagina. A definite contraction ring was palpable. The temperature was 103°, and the pulse 104. The pelvic measurements were small and the outlet contracted. An anterior face presentation was diagnosed. Fetal heart was not heard. A craniotomy was performed and the baby delivered with the cranioclast. It was then discovered that there were twins. The second baby was delivered by internal podalic version and extraction; it was necessary to perforate the after-coming head to facilitate its delivery. The placenta was manually extracted. A complete laceration of the perineum was unsutured because of the patient's poor condition. She died of shock and sepsis seven hours postpartum. The uterus was ruptured transversely in the lower segment.

CASE 6.—(Hospital No. 28797.) 1922. Mrs. L., aged twenty-eight years, gravida viii, para vii, was fully dilated two hours without progress. The pelvic measurements were normal. The position was R.O.P. and the station of the head midpelvis. An attempt was made, under full ether anesthesia, to rotate the head manually to the R.O.A. position. A loop of umbilical cord prolapsed down into the vagina during this maneuver. Version was then decided upon. The head was suddenly felt in the left iliac fossa during the process of turning the baby. The operator's hand was then inserted through a rupture of the lower segment and the version completed. The placenta was manually extracted. The patient was immediately transferred to the hospital by ambulance without uterine tamponade. She was in extreme shock on entry, and was pulseless. A transfusion was given during a supravaginal hysterectomy. At laparotomy, the laceration was found to extend from the left side of the cervix up into the left broad ligament. Drains were inserted into the pelvis through the vagina and the lower end of the abdominal wound. She made a good convalescence. The baby was discharged, with the mother, in good condition.

CASE 7.—(Hospital No. 29176.) 1922. Mrs. M., aged thirty-six years, gravida viii, para viii, was delivered at home after a fifteen-hour labor. The membranes had been ruptured forty-eight hours. Pelvic measurements were normal. Four vaginal examinations were performed during labor. There was no progress after the cervix became one-half dilated. The cervix was manually dilated. A brow presentation was found, but the head could not be flexed because of two loops of cord about the baby's neck. The uterus was dry and was shut down tightly about the baby. The head was pushed up and a version done with "very great difficulty." The baby's right humerus was fractured and one leg lost considerable skin during the extraction. The baby, however, was easily resuscitated, and it survived. The mother went into profound shock at delivery. The pulse was 150, feeble, and irregular. The placenta was expressed by Credé. Examination showed the uterus completely torn off anteriorly in the lower segment. She was sent to the hospital without uterine tamponade and died before a transfusion could be given.

the illustration, corresponded closely to the preoperative findings. The lower half of the cervical canal and the surface of the vaginal portion were quite normal. The newgrowth was essentially superficial, but even with the naked eye the extension of the pathologic process into the underlying uterine wall could be seen plainly. Sections from the upper portion of the tumor (Fig. 2), that is, from the upper border in the uterine cavity (*b*) to the internal os (*a*) showed papillary excrescences in which slender connective tissue stems carrying blood vessels, were covered with many layers of squamous cells. Most of these were hornified, and in many places typical horn pearls were present. Nowhere was there a trace of the original cubico-cylindrical epithelium and the glands of the uterine mucosa. Where the growth had invaded the musculature, a few muscle fibers (*m*) were discernible. Even in this

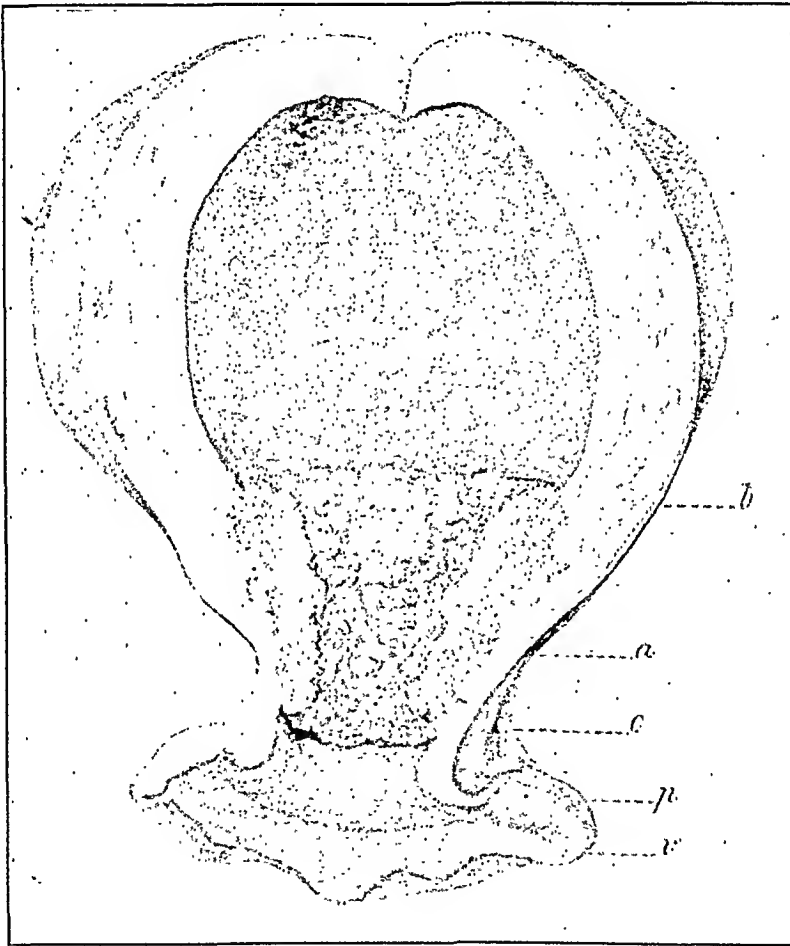


Fig. 1.

deepest layer epithelial pearls were numerous. In contradistinction to these pictures, sections taken from the intracervical portion, that is from the internal os (*a*) to the lowermost border of the tumor (*c*) in the cervical canal, showed a greatly diminished activity of growth. Not only was the degree of hornification less but also here and there lumina of cervical glands could be seen. This indicated that the intrauterine part of the tumor was the older and, therefore, the primary seat of this unusual carcinoma which by continuity had extended to the cervical canal.

CASE 2.—Woman of fifty years, mother of two children, had noticed for the past five months a more or less constant bloody discharge. The uterus was about twice its normal size and of doughy consistency. In the speculum dark bloody discharge issued from the normal external os. The latter admitted the tip of the index finger, and the mucosa of the cervical canal was perfectly smooth on touch. The curette,

CASE 12.—(Hospital No. 41782.) 1929. Mrs. H., aged twenty-nine years, gravida vi, para vi, was admitted to the hospital in the fifth month of her pregnancy for the treatment of uterine hemorrhage. A diagnosis of inevitable miscarriage was made. In order to facilitate expulsion the membranes were artificially ruptured. Pituitary extract was administered intramuscularly. The cervix, twenty hours later, was one inch in length and admitted one finger. Manual dilatation of the cervix was chosen as the best procedure. The cervix was very resistant and "suddenly the hand could be put inside the uterus. Loops of bowel were palpated and brought down." The baby and placenta were then extracted. At laparotomy, a tear was found to extend from the right side of the cervix out into the broad ligament just posterior to the uterine artery. A supravaginal hysterectomy was performed, and drains were inserted through the cervix and into the posterior culdesac by the abdominal route. She developed peritonitis, ran a septic course, and was very sick, but recovered after thirty days without transfusion. The convalescence was complicated by anemia and pyelitis.

CASE 13.—(Hospital No. 50730.) 1931. Mrs. G., aged thirty-five years, gravida v, para v, was admitted at term, in active labor. The presentation was transverse, with the head in the left iliac fossa. The pelvic measurements were normal. Twelve inches of umbilical cord prolapsed soon after admission. Vaginal examination revealed full dilatation of the cervix. Internal podalic version failed because of a contraction ring. The cord stopped pulsating. Several attempts were then made at high forceps delivery, all failing because of the inclination of the symphysis. Version was again attempted. As this was unsuccessful, craniotomy was performed, but the cranioelast continually slipped off the skull. Version was tried a third time. After several attempts to push the head through the contraction ring, "a snap was heard and the head was then felt in the peritoneal cavity." A laparotomy was immediately performed and a stillborn infant, weighing 7½ pounds, was extracted. A transverse tear was found in the lower uterine segment, dissecting behind the bladder and communicating into the bladder at one point. A supravaginal hysterectomy was performed, and the ruptured area in the bladder was sutured. Vaginal and abdominal wicks were inserted. The patient, postoperatively, drained urine both by vagina and through the abdominal incision. An inlying catheter was placed in the bladder. She developed pneumonia, acute local peritonitis, and cystitis. One transfusion was given. She ran a febrile course for three weeks, the temperature varying between 100° and 102°, but she finally recovered.

CASE 14.—(Hospital No. 53604.) 1932. Mrs. H., aged thirty-one years, gravida x, para vii, was admitted to the hospital with premature rupture of the membranes and a breech presentation. Pelvic measurements were large. Sixteen hours later, castor oil and quinine were given, but labor did not begin until seventy hours after rupture of the membranes. After four hours of active labor the fetal heart became rapid, then slow and weak. Vaginal examination revealed the cervix three-fourths dilated, the breech high, and the position R.S.A. The dilatation was completed manually and was followed by an immediate breech extraction. The latter was difficult. The head was held up by the cervix but was finally delivered with Piper forceps. The baby gasped a few times, then died. The cervix was lacerated out into the vault. The laceration was sutured from below. Immediately after delivery the mother's condition was satisfactory. The blood loss was estimated at 100 c.c. One and one-half hours after delivery she bled vaginally and went into severe shock but responded well to the administration of 10 per cent glucose solution intravenously. One and one-half hours later she went into severe shock again, and died during the intravenous administration of fluid, before a transfusion could be started.

CASE 15.—(Hospital No. 12533.) 1933. Mrs. McD., aged thirty-four years, gravida iv, para iii, admitted to the hospital at term in active labor. She was very

there any trace of a glandular arrangement. The cells are for the most part fairly uniform in size, oblong, with well-stained nuclei and numerous mitoses. Here and there within this cell mass a few cells assume a larger size with a large cell body, and toward the left of the picture these fully matured cells present clearly the appearance of pavement epithelium.

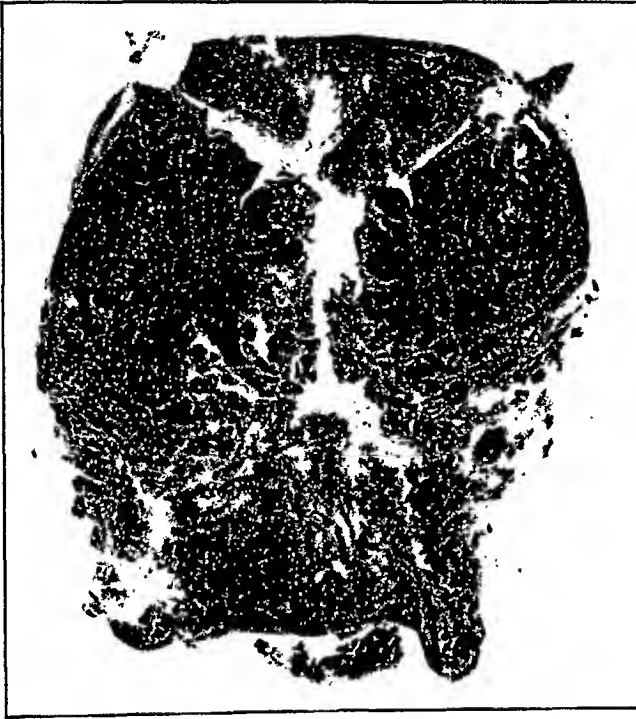


Fig. 3.

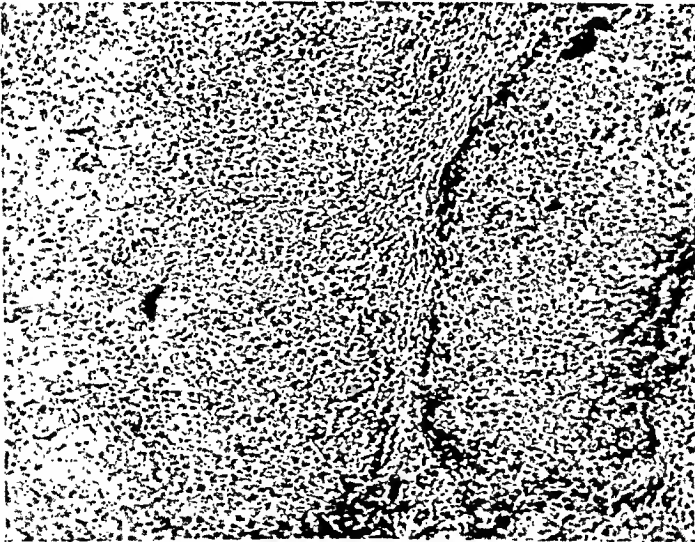


Fig. 4.

DISCUSSION

It is understood that the paper deals only with *primary* squamous cell cancer of the uterine body. This excludes at once those cases where the primary growth occupied the vaginal portion but extended, either by con-

ment scar of the transverse type, which occurred after full dilatation of the cervix, following a sixteen-hour labor. (Case 26). This patient had been delivered by classical cesarean section the preceding year.

SPONTANEOUS RUPTURE

CASE 18.—(Hospital No. 28116.) 1921. Mrs. B., aged twenty-eight years, para i, was in labor twenty-two hours. The cervix was fully dilated and the head was on the perineum. The uterus was not relaxing well between contractions, so labor was terminated by a low forceps delivery. Catheterization before delivery revealed grossly bloody urine. The baby was stillborn. The placenta was expressed by Credé and showed an area of premature separation. A second degree laceration of the perineum was repaired at delivery. The patient complained of tenderness in the left costovertebral angle and in the left lower quadrant of the abdomen following recovery from the anesthetic. Urinary incontinence was noted and urine obtained from the bladder with a catheter was grossly bloody. Vaginal examination disclosed a laceration in the middle of the anterior lip of the cervix which extended on to the anterior vaginal wall. This tear gave a direct communication into the bladder. She died on the fifth postpartum day of peritonitis and extravasation of urine into the cellular tissue of the left broad ligament and left side of the pelvis.

Autopsy showed the anterior wall of the uterus torn upward from the cervix for a distance of 11 cm. This rent was to the left of the midline and communicated with the cavity formed by the separation of the layers of the broad ligament, and with the bladder. The anterior wall of the vagina presented an opening just superior to the cervix, 1 cm. in diameter, which communicated with the bladder. The pelvic mass and retroperitoneal cavity contained bloody urine.

The pathologist, Dr. Wolbach, reported: "The pelvic mass and continuous retroperitoneal cavity contained fluid which, though blood-tinged and turbid, was evidently urine. The walls of this cavity presented the characteristic appearance attending extrinsic urinary extravasation accompanied by infection. This extrinsic extravasation implies a rupture of the bladder at a time preceding delivery, otherwise escape of urine would have occurred through the channels revealed by the examination of the pelvic organs. It, also, seems improbable that the opening of the bladder, because of its nearly circular shape and restriction to the region of the trigone, could have been caused by a sudden application of force. It seems probable that a hematoma must have existed, and that the bladder communication was established by necrosis of the bladder wall subsequent to the hematoma and pressure. The origin of this hematoma probably arose from a tear in the uterus at the cervix."

CASE 19.—(Hospital No. 12361.) 1933. Mrs. McD., aged twenty-nine years, gravida ii, para ii, was admitted to the hospital in shock. For two days she had had abdominal pain, which became severe and constant six hours before entry. Subsequent history revealed that she had been taking oil of tansy for several days in order to bring about a miscarriage. Examination showed a tender, boardlike abdomen. There was no vaginal bleeding. At laparotomy a rupture of the uterus, 17 cm. long, was found behind the left cornu. The peritoneal cavity contained a large amount of blood. A stillborn infant was extracted by cesarean section, following which the uterus was amputated. One transfusion was given. Three days later there was bleeding from the abdominal wound. No single bleeding point could be discovered when the incision was opened. The tissues were so friable that on inspection a loop of bowel was perforated and stripped of its mesentery. Intestinal contents were inadvertently spilled into the peritoneal cavity. Twenty-four inches of intestine were resected and the abdomen closed with drainage. The patient died of general peritonitis. Autopsy revealed multiple perforations of the ileum. Extreme friability of tissues was by far the most notable finding.

ciliated; in the cervical canal the cells are again high and produce mucus; and upon the vaginal portion and the vaginal walls the epithelium is of the multiple squamous variety. Occasionally this pavement epithelium extends a very short distance into the lowermost part of the cervical canal. It seems plausible that sometimes either "aberrant" squamous cells are left in the uterine mucosa or that among the uterine cylindrical cells some remain undifferentiated and later develop into squamous cells. All this, of course, is highly speculative. It is a fact, however, that squamous cells have been found in the uteri of newborn and infants up to two years of age (Natanson¹⁴ a.o.). Although menstruation and pregnancy almost certainly do away with such embryonic remnants, this need not invariably be the case. This, at least, is my interpretation of the interesting observations made by Sitzenfrey,¹⁵ Polano,¹⁶ R. Meyer¹⁷ and, more recently, Hintze.¹⁸ These authors found squamous cell nodules in the hyperplastic endometrium and in true adenoma, and even in adenocarcinoma (Ewing¹⁹) of the uterus both in deeper layers and superficially. Though these accumulations of ectopic squamous cells not infrequently were hornified and even presented typical pearls, their benign nature could be established with certainty in every case. It is, however, entirely conceivable that such atypical formations may under the influence of an unknown stimulus undergo malignant degeneration and thus give rise to a squamous cell carcinoma in the uterine cavity.

In spite of the rarity of the condition the diagnosis presents no particular difficulties when the vaginal portion is found free and an exploratory curettage has yielded material which, on microscopic examination, reveals the picture of squamous cell carcinoma. Other diagnostic criteria, bleeding and, possibly, enlargement of the uterus, are probably identical with those of adenocarcinoma.

It was once believed that the prognosis was worse because squamous cell cancer in the uterine cavity possessed greater invasive tendencies than adenocarcinoma; but the available data are not conclusive.

Regarding treatment, hysterectomy, as in cancer of the body in general, is preferable to radiotherapy. This is nowadays fairly well established, and only recently Sampson²⁰ has stressed convincingly the limitations of intrauterine radium treatment. The latter should be reserved for truly inoperable cases or where the general condition of the patient renders any surgical intervention undesirable. Abdominal hysterectomy which, needless to say, should comprise the removal of the entire uterus and both adnexa, has the disadvantage that during the almost unavoidable kneading of the uterus carcinomatous particles may be dislodged into the vagina or the lymphatics, and thus jeopardize a permanent cure. Aside from utmost gentleness during the operation, the external os should at any rate be sewed up securely as a first step. On the whole, abdominal hysterectomy should, therefore, be employed principally where the uterus is greatly enlarged. In all other cases, vaginal hysterectomy is the method of choice. This is confirmed by statistics of imposing size. While the percentage of permanent cure from both the abdominal and the vaginal hysterectomy is about sixty, that of the vaginal operation alone is nearer eighty. If, in addition, the vaginal hysterectomy is carried out in local anesthesia, as advocated

CASE 24.—(Hospital No. 37827.) 1927. Mrs. H., aged thirty-one years, gravida ii, para ii. A cesarean section had been performed in the first pregnancy for “marginal placenta previa, contracted pelvis, and breech presentation.” The pelvic measurements as obtained in the present pregnancy were normal. She was seized suddenly in the middle of the night, during the thirty-second week of her pregnancy, with severe abdominal pain. She was transferred to the hospital in marked shock. A laparotomy and transfusion were simultaneously performed. The sear was completely separated. The fetus and placenta were free in the abdominal cavity. A supravaginal hysterectomy was performed. The abdomen was closed without drainage. The temperature was 101° on the first and second days after operation, but then came to normal and she had a subsequent uneventful convalescence. She was discharged on the eighteenth postpartum day.

CASE 25.—(Hospital No. 43997.) 1929. Mrs. C., aged twenty-four years, gravida ii, para ii, was admitted as an emergency case at the thirty-sixth week of her pregnancy. She had had a cesarean section in 1925; the reason for the operation was unknown. The patient called in her family physician because she had abdominal pain and thought she was starting in labor. The doctor did a vaginal examination, then administered a hypodermic injection of pituitrin, following which she developed severe, persistent abdominal pain. She was transferred to the hospital twelve hours later and presented classical signs of concealed intraperitoneal hemorrhage. A complete rupture of the sear was found at operation. The fetus and placenta were free in the abdominal cavity. A supravaginal hysterectomy was performed. One transfusion was given. She had a prolonged, febrile convalescence, and developed wound sepsis, a pelvic mass, and intestinal obstruction, but finally recovered after fifty-nine days.

CASE 26.—(Unit History No. 3924.) 1934. Mrs. M., aged thirty-three years, gravida vii, para iii, entered the hospital for a repeat cesarean section. Six years before entry a Kerr cesarean section had been done after a test of labor of twelve hours' duration. Four years later, a repeat classical cesarean section was performed. She had had labor pains for sixteen hours prior to entry. Examination revealed strong uterine contractions. Soon after admission the uterus became boardlike. The patient complained of extreme abdominal pain. The pulse rose from 90 to 150. The fetal heart dropped to 60. There was no vaginal bleeding. An immediate laparotomy was performed and a 7 pound baby was extracted through a tear of the lower segment. This rupture was at the site of the previous Kerr sear. The classical sear was intact. The rupture extended into the posterior wall of the bladder. A supravaginal hysterectomy was performed. A suprapubic drain and a urethral catheter were placed in the bladder. One transfusion was given. The baby died.

TABLE VI. LOCATION AND EXTENT OF THE RUPTURE

	COMPLETE RUPTURE	INCOMPLETE RUPTURE
Traumatic	11	6
Spontaneous	7	2
Lower segment	12	
Anterior wall (one Kerr cesarean)	8	
Posterior wall	2	
Lateral wall	2	
Fundus	6	
Classical cesarean sear	3	
Sear of previous rupture	1	
Posterior wall	1	
Pregnant horn	1	
Cervix into broad ligament		7
Fundus (cesarean sear)		1

PUERPERAL INFECTION DUE TO ANAEROBIC STREPTOCOCCI*

OTTO H. SCHWARZ, M.D., AND T. K. BROWN, B.S., M.S., M.D.,
St. Louis, Mo.

(From the Department of Obstetrics and Gynecology, Washington University School of Medicine, Barnes Hospital and the St. Louis Maternity Hospital)

ABOUT twelve years ago Dieckmann and one of us (O. H. S.) discussed the bacteriology of our cases of puerperal infection. Quite frequently in cases that were obviously infected, both uterine and blood cultures were negative. This experience caused us to focus our attention on the work Schottmüller reported in 1910, in which he called attention to the frequency of puerperal infection due to anaerobic streptococci. This work was never confirmed on a large scale outside of his own clinic. In 1921, Bingold, working in Schottmüller's clinic, reported further experiences with these infections.

On July 1, 1924, Dieckmann took charge of all cases of puerperal infection on our service, and blood and uterine cultures were grown both aerobically and anaerobically. In a little over a year, we were able to confirm all of Schottmüller's statements, and in this short period observed several fatal cases of infection due to anaerobic streptococci. The work was continued and subsequent reports show the high frequency of anaerobic streptococci in our cases.

Owing to the fact that anaerobic streptococci are found in the vaginas of 40 per cent of women at term, it is quite obvious that these organisms are not introduced, but give rise to endogenous infections. The circumstances under which these organisms take hold are in cases of prolonged labor where the tissues have been bruised to some extent, also in cases where the membranes have been ruptured for some time before labor, and in difficult operative deliveries. During the first two years of this work, it was clearly demonstrated, so far as our own cases which were uninfected before admission were concerned, that our problem was chiefly the keeping down of anaerobic infection, infections due to other pathogenic organisms being well controlled by proper obstetric technic.

From September, 1926, to January, 1930, we used instillations of mercurochrome, iodine and glycerin, routinely. This procedure was somewhat similar to that used by Bessesen. The morbidity due to puerperal infection was cut practically in half, the figure being fairly

*Read, by invitation, at a meeting of the New York Obstetrical Society, December 11, 1934.

2. Sixty-five per cent of the ruptures resulted from the trauma of an operative delivery through the pelvis.

3. In 12 of 17 cases of traumatic rupture, internal podalic version was the ultimate type of delivery.

4. Five of 9 cases of spontaneous rupture followed previous cesarean section.

5. Multiparity is a prominent etiologic factor; only 2 in this series were primigravidas.

6. The maternal mortality was 42.3 per cent, fetal 82 per cent.

7. The treatment of choice is hysterectomy soon after the occurrence of rupture.

8. Transfusion markedly influences prognosis.

I desire to express my deep appreciation to Dr. Frederick C. Irving, Obstetrician-in-Chief of the Boston Lying-In Hospital, for the privilege of allowing me to undertake this study, and to Dr. John A. Sampson, Chief Gynecologist of the Albany Hospital, for much valuable criticism in the preparation of the paper.

REFERENCES

- (1) *Davis, A. B.*: AM. J. OBST. & GYNEC. 13: 524, 1927. (2) *Hurd, R. A.*: AM. J. OBST. & GYNEC. 26: 890, 1933. (3) *DeLee*: Textbook of Obstetrics, ed. 6, Philadelphia, 1934, W. B. Saunders Company.

THE VASCULAR ASPECT OF ECLAMPSIA*

FREDERICK C. IRVING, M.D., F.A.C.S., BOSTON, MASS.

(From the Department of Obstetrics, Harvard Medical School, and the Boston Lying-In Hospital)

THE search for the cause of eclampsia has inspired a multitude of theories which have spanned the entire range from mere conjectures to elaborate hypotheses and have produced a literature of vast extent. There have been few attempts, however, to approach the subject from the side of pathology. Rather have the theorists preferred to fit the manifestations of the disease into their preconceived notions of its etiology than to take as a point of departure the demonstrable changes produced in the human body, and to find therein a common factor for all the signs and symptoms. The identification of this common factor is the first step toward the solution of the problem, for its cause must also be the cause of the disease.

It is not my purpose to speculate concerning the cause of eclampsia but only to point out certain features of the morbid anatomy, some long familiar, others more recently brought to light, to indicate how they may be explained on a common pathologic basis, and to demonstrate, so far as is possible, how they may produce the familiar clinical signs and symptoms.

*Read before the Obstetrical and Gynecological Travel Club, Pittsburgh, December 4, 1934.

Type C, slower growth. After a week, produce coal black colonies on blood agar. Extremely fetid odor.

Type D, very few strains which give hemolysis on the surface of blood agar. May be variants of Types A or B.

Colebrook and Hare were unable to state definitely how many of their strains belonged to Types A and B, respectively, partly because the differentiation has only gradually emerged during the progress of the work, many strains having been lost before they were recognized; partly also because the differentiation is not always sharp enough to identify strains definitely with one type or the other.

During our study of the anaerobic streptococci obtained from cases of puerperal infection, we have paid particular attention to the cultural characteristics of the organisms found in each case. The colonies have shown the characteristics as described by Colebrook and Hare and would fit into their method of classification very readily. The division into types has not been made, but will be from now on. The actions of the organisms upon meat media (Bell) are closely noted as to gas formation, odor, pigment formation and digestion. The latter observation is of the utmost importance in the consideration

TABLE II. MORBIDITY FROM PUERPERAL INFECTION

	ADMISSIONS	INFECTIONS	PERCENTAGE
July, 1924, to Sept., 1926	2,194	45	2.05
Sept., 1926, to Jan., 1930	5,385	68	1.26
Jan., 1930, to Jan., 1933	5,381	74	1.37
Jan. 1, 1933, to July 1, 1934	2,804	41	1.46
Of 74 cases of infection between Jan., 1930, and Jan., 1933, 43 were infected before admission.			
Of 41 cases of infection between Jan. 1, 1933, and July 1, 1934, 32 were infected before admission.			

TABLE III. MORTALITY FROM PUERPERAL INFECTION

	DELIVERIES	DEATHS	PERCENTAGE	SECTIONS
July, 1924, to Sept., 1926	1,913	6	0.313	2
Sept., 1926, to Jan., 1930	4,494	4	0.089	3
Jan., 1930, to Jan., 1931	1,587	1	0.063	1
Jan., 1931, to Jan., 1932	1,535	2	0.13	2
Jan., 1932, to Jan., 1933	1,350	0	0.0	0
Jan., 1933, to July 1, 1934	2,358	0	0.0	0
	13,237	13		8

TABLE IV. TYPES OF ORGANISMS IN TOTAL OF 31 FATAL CASES

Anaerobic streptococcus	15	(4)*
Hemolytic streptococcus	7	(2)*
<i>Staphylococcus albus</i>	7	(6)*
<i>Streptococcus viridans</i>	1	(0)*
Nonhemolytic streptococcus	1	(1)*
	31	(13)*

*Uninfected before admission.

absence of blood cells in the capillary lumina which produced a marked ischemia. Hyaline thrombi were found within the loops (Fig. 1). Weir, working in our pathologic laboratory, measured in microns the diameters of the glomeruli in 7 cases of eclampsia and compared them with the glomeruli of an equal number of normal kidneys. In each case 50 glomeruli were measured and the averages were taken. In 5 of 7 eclamptic patients the average was definitely greater than normal. In the remaining 2 cases one showed a slight decrease over the normal and the second a considerable decrease. Fahr considered these changes in the glomeruli to be due to spasm of the afferent arterioles and believed that they were accompanied by swelling of the vessel walls. The tubules exhibit albuminous degeneration which may advance to hyaline formation and fatty changes. Study of our specimens has in-

Blood pressure 120 mm Hg -
less 40 m.m. osmotic pressure
of plasma proteins = 80 m.m.
available for filtration.

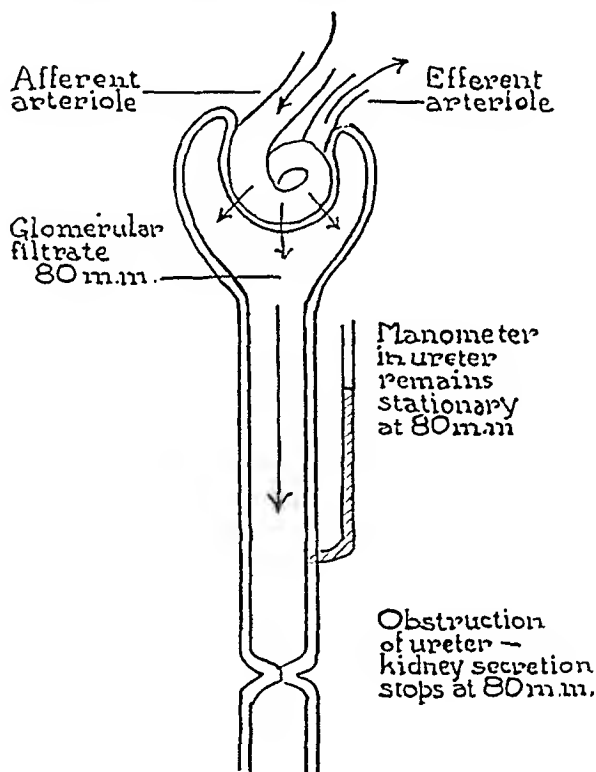


FIG. 2.—The hydrostatics of urinary secretion.

dicated that not all glomeruli are always equally involved, and that in some cases individual ones may escape entirely. In sections from such kidneys we have found injury only in the tubules draining the affected glomeruli. This may be explained on an anatomical basis, since an efferent arteriole, after leaving its glomerulus, plays a large part in the nutrition of the appended tubule. Spasm of the efferent arterioles therefore will impede the exit of blood by the afferent arteriole and so cause damage to the tubule. Further information regarding the nature of the glomerular changes was supplied by Bell, who in 1932, by the use of the special azo-carmin stain, demonstrated a massive thickening of the capillary basement membrane.

What clinical findings in eclampsia may be explained by the changes in the kidney? Before discussing this question it will be profitable

TABLE V—CONT'D

4668 Term	Yes	-	-	Anaerobic strep.	Neg.	Peritonitis, general	Cesarean section	No. 2828
							Supravaginal hysterectomy	
4899 Term	Yes	-	-	Anaerobic strep.	<i>B. coli</i> Anaerobic strep.	Septicemia, endometritis, pelvic cellulitis	Instrumental, 11 days before admission	No
5510 Term	No	-	-	<i>Strep. putridus</i>	<i>Strep. putridus</i>	Endometritis, peritonitis local, pelvic thrombo., septicemia	Spont. mem. ruptured 51 hr.	No
6504 Term	No	-	-	<i>Staph. albus hemolyticus</i>	<i>Staph. albus hemolyticus</i>	Endometritis, infarct of lung, peritonitis	Induced	No
6702 2 wk.	Yes	Yes	-	None	<i>Strep. viridans</i>	Septicemia, infarct of kidney and spleen, thrombosis of cerebral artery	-	No. 2949
M. H. 22 32 wk.	Yes	-	-	Anaerobic strep.	Neg.	Endometritis, peritonitis, ruptured uterus	Breech with contracted pelvis	No. 3151 Autopsy Bl. culture, an. strep. No. 3167
210 3 mo.	Yes	Yes	-	<i>Staph. albus</i> Anaerobic strep.	<i>Staph. albus</i>	Septicemia, endometritis, embolic pneumonia, pelvic thrombophlebitis	-	No. 3172
215 36 wk.	Yes	-	-	Anaerobic strep.	Neg.	Endometritis, peritonitis, thrombophlebitis, embolic pneumonia (extreme postmortem autolysis)	O.P.D. Premature stillborn	

With these physiologic facts in mind we can turn our attention to the signs of preeclampsia and eclampsia which may be attributed directly and without question to faulty function of the kidneys. These are albuminuria, oliguria, hematuria, and tubular casts. Vascular spasm of the afferent vessels produces anoxemia of the walls of the glomerular loops, which results in their increased permeability, so that albumin is allowed to pass through. Experimental clamping of the renal artery will produce albuminuria when the constriction is released. The sudden onset of marked albuminuria which so often precedes or accompanies an eclamptic attack may be thus satisfactorily explained on the basis of an abrupt arteriolar spasm. With the relief of the attack



Fig. 4.

Fig. 4.—The liver in eclampsia. Note the midzonal hemorrhage and necrosis. *C. V.*, central vein; *P.S.*, portal space.



Fig. 5.

Fig. 5.—Thrombosis in a radicle of the hepatic artery in eclampsia.

the albumin disappears often with even greater rapidity, so that within twenty-four hours the urine may contain little more than the slightest possible trace. Oliguria is accounted for in the same way; the more severe the spasm the less the amount of urine which passes through the glomeruli. The same rapid return to the normal amount of excretion accompanies recovery as was the case with albuminuria. Casts are formed in the tubules. They result from the solidification of albuminous material in the absence of sufficient fluid to hold it in solution. Hematuria may result from stagnation of blood in the branches of the afferent

TABLE V—CONT'D

1930	Term	Yes	-	-	<i>Strep. hemolyticus</i>	<i>Strep. hemo-lyticus</i>	Endometritis, peritonitis, local septicemia	Spontaneous	No
8308	Term	No	-	-	<i>Staph. albus</i>	Negative	Endometritis, peritonitis, general	Cesarean	Yes
1931	Term	No	-	-	<i>Staph. albus</i>	Negative	Endometritis, postoperative wound infection, emb. lung abscess. Lung abscess	Cesarean ruptured uterus	Yes
4668	Term	No	-	-	<i>Strep. hemol.</i> Gram neg. bac. Anaerobic strep. (autopsy)	<i>Strep. hemol.</i>	Peritonitis general, endometritis, septicemia	Low cervical section	Yes
12940	Term	Yes	-	-	<i>Staph. albus</i> (autopsy)	Negative	Endometritis, peritonitis, postoperative wound infection, pulmonary embolism	Low cervical section	Yes
1932	3 mo.†	Yes	Yes	-	Anaerobic strep.	Anaerobic strep.	Endometritis septicemia, thrombophlebitis	-	No
1933	2½ mo.	Yes	Yes	-	Anaerobic strep.	Anaerobic strep.	Endometritis, peritonitis, bronchial pneumonia	-	No
1934	3 mo.	Yes	-	Yes	Hemol. strep. <i>Staph. albus</i> Few anaer. strep. Anaerobic strep. (autopsy)	Hemol. strep. <i>Staph. albus</i>	Endometritis, peritonitis, septicemia	-	Yes
20051	Term	Yes	-	-	Anaer. strep. (autopsy)	Anaer. strep. (autopsy)	Endometritis, peritonitis, thrombosis of left ovarian vein	-	Yes

Few of the signs or symptoms of eclampsia may be attributed to derangement of the liver. Probably the only one which can so qualify without question is jaundice, which is found only in cases of extreme severity.

Two other of the abdominal organs in our experience not infrequently exhibit vascular lesions. These are the adrenals and the spleen, both of which may be the seat of hemorrhages. In the adrenals the extravasation of blood occurs in the cortex and is accompanied in some instances by engorgement of the capillaries (Fig. 6).

The general peripheral circulation in the preeclamptic and eclamptic states shows evidences of arteriolar spasm.

Hinselmann³ and Nevermann¹⁴ observed the behavior of the capillaries at the base of the nail. They found that the loops were lengthened but that there was no tortuosity. There is thickening of the venous loop, stasis, and granular flow. Occasionally, due to vascular spasm, the arterial loop disappears to be followed by a like disappearance of the venous loop as if from the action of a peristaltic wave. Mylius,¹⁵ using the Nordensen camera, showed in the retina the occurrence of spastic and tetanic vascular processes in 8 of 12 cases. Wagener¹⁶ has made the first study of successive changes in the retinae of individuals with preeclampsia. The first visible sign was a narrowing of the arterioles accompanied or followed by hemorrhagic areas and cotton wool exudate and finally diffuse albuminuric retinitis. In his opinion the variability of the constriction represented a spastic process, which might pass into permanent sclerosis if the preeclamptic state were allowed to continue.

The usual sequela of preeclampsia or eclampsia is permanent vascular hypertension, or hyperpiesia, due in all likelihood to definite thickening of the arteriolar walls.

Corwin and Herriek,¹⁷ in a study of 165 cases of the subacute or hypertensive toxemias of pregnancy, found that 74 per. cent showed cardiac hypertrophy, sclerosis of the radial or brachial arteries and vascular eye changes from six months to six years postpartum and that one-third of these exhibited a persistent hypertension. Similar observations have been made by Peckham¹⁸ and by Berman¹⁹ and attributed, probably erroneously, to nephritis.

The special behavior of the blood pressure in preeclamptic and eclamptic patients must have attracted the attention of all who have observed many patients of this kind. The systolic pressure is extremely variable, being much higher on some occasions than on others in patients who are under constant observation. Moreover, we have noticed that blood pressure observations on both arms simultaneously not infrequently show a difference of as much as 20 mm. Hg, a phenomenon strongly suggestive of vascular spasm affecting at the same time different vessels unequally. Further evidence has been adduced by the unpublished work of Alexander in our clinic on the presence or absence of an artificially produced Duroziez's sign. Duroziez's sign is the familiar diastolic murmur which may be heard over the larger peripheral arteries in aortic regurgitation.

and develops only when conditions favor their growth. Infections which are due to ordinary pathogenic organisms, such as various strains of hemolytic streptococci and staphylococci, can be controlled by good obstetric technique. Schottmüller, whose experiences are entirely similar to this report, reviewing his experiences up to 1928, concludes that the control of infections from without is a less difficult problem than those which develop from organisms harbored by the patient herself. In conclusion, he makes the statement, "Heute muss es also heissen: Die Gefahr kommt weniger von aussen als von innen."

From our own experiences with vaginal instillations, it would seem that in the last eight years we have practically eliminated the serious cases of puerperal infection due to anaerobic organisms. Since 1930, there have been three deaths on our service, two of these due to *Staphylococcus albus* and one to a mixed infection in which the hemolytic streptococcus was the predominant organism.

This report completes a ten-year study which has been continued as a routine procedure and it has definitely confirmed all the contentions of Schottmüller. As these facts become more generally appreciated, and as we gain further knowledge concerning the etiology and treatment of this type of puerperal infection, the name of Hugo Schottmüller shall take equal rank with that of the great Semmelweis.

REFERENCES

- (1) Schwarz, O. H., and Dieckmann, W. J.: South. M. J. 19: 370, 1926. (2) Schwarz, O. H., and Dieckmann, W. J.: AM. J. OBST. & GYNEC. 13: 467, 1927. (3) Brown, T. K.: AM. J. OBST. & GYNEC. 20: 300, 1930. (4) Brown, T. K., and Soule, S. D.: AM. J. OBST. & GYNEC. 23: 532, 1932. (5) Schottmüller: Mitteilurgen a. d. Grenzgeb. d. Med. u. Chir. 21: 450, 1910. (6) Bingold: Arch. f. Path. Anat. u. Phys. 234: 332, 1921. (7) Bessesen, D.: M. J. & Rec. 124: 27, 75, 1926. (8) Brown, T. K.: J. Kansas M. Soc. 36: 7, 1935. (9) Colebrook, L., and Hare, R.: J. Obst. & Gynec. Brit. Emp. 40: 609, 1933. (10) Schottmüller, H.: München. med. Wehnschr. 75: 1580, 1634, 1928.

630 S. KINGSHIGHWAY BOULEVARD

Davis, Albert A.: Local Anaesthesia in Gynaecology, Brit. M. J. 1: 636, 1935.

The author enumerates the disadvantages of general and the advantages of local anesthesia. He describes the technique of the latter for removal of external tumors and cysts, operations on the cervix, colporrhaphy, and pudic nerve block. While morphine-scopolamine narcosis is often employed as premedication for local anesthesia, he prefers nembutal, gr. 1½ on the night preceding operation and gr. 3 one-half hour before operation.

F. L. ADAIR AND S. A. PEARL.

patients who had preeclampsia for the first time, only 1 failed to manifest the phenomenon, thus indicating that the failure of Duroziez's sign is probably more indicative of arteriolar sclerosis than of arteriolar spasm.

The factors which determine the blood pressure are the output per minute of the heart, the force of the cardiac contraction, the viscosity of the blood, and the peripheral resistance. Since no evidence exists that these other factors are altered sufficiently to produce clinical manifestations, we may attribute the hypertension characteristic of the disease to an increase in the peripheral resistance, either in the kidney alone or in the general arteriolar system. In either event the elevation of blood pressure is apparently a protective mechanism, since it is an attempt on the part of the organism to maintain an adequate filtration pressure in the glomeruli.

The passage of fluid from the capillaries into the tissue spaces or in the opposite direction is regulated by the antagonistic action of the hydrostatic or capillary pressure which forces fluid out of the vessels, and the osmotic pressure of the plasma proteins which tends to hold it within (Fig. 7). According to Starling,²¹ the permeability of the vessel walls may be increased by an impairment of their oxygen supply and edema may so result. Such an anoxemia may be caused by arteriolar spasm. In this case the passage of fluid outward may be slightly aided by the somewhat diminished plasma proteins found in preeclampsia and eclampsia. In acute glomerular nephritis the protein content of the edema fluid is greater than that of the blood, which is suggestive of damage to the capillary walls. No such studies have been conducted on the edema fluid in eclampsia. If made, they might be productive of considerable information regarding the mechanism of this important manifestation.

The pathologic examination of the brain in eclampsia shows a variety of lesions.

Braunmühl²² found ischemic cell disease which he believed due to vasoconstriction. Jaffé²³ considers that vascular spasm may cause necrosis of the vessel wall, followed on the relief of constriction by vascular rupture due to the sudden access of blood. Benoit²⁴ and de Vries²⁵ also attribute the character of the changes to primary spasm of the cerebral arteries and arterioles. Rowntree²⁶ has shown that if water in larger amounts is given to experimental animals, vomiting, convulsions, and coma are produced. This observation may have some bearing on the etiology of convulsions, since the presence of excessive edema added to the arteriolar spasm may be a factor in their production.

If we accept the hypothesis that arteriolar spasm is the common factor in eclampsia, the next question concerns the cause of this phenomenon. Constriction and dilatation of the blood vessels is controlled by the vasomotor center, which is situated in the floor of the fourth ventricle at the level of the calamus scriptorius. Any substance which will

In view of his previous work along this line, the theoretical aspect of this study was delegated to Jacobs, who conducts "abnormal pelvis" clinics at Gallinger Municipal, Georgetown University and Garfield Memorial Hospitals. The Clinic at Garfield is under direct supervision of Garnett.

The obstetric inclinometer, devised by Jacobs² in 1928, made possible the study of pelvic inclination in living women. This instrument measures accurately the inclination of all the pelvic planes and the length of the important diameters. It makes possible the reproduction of a cross-section of the pelvis known as the pelvigram, and affords information desirable in the performance of accurate pelvic roentgenography. By careful observation of eighty symmetrical pelvises of apparently normal individuals and aided by the use of the inclinometer and the lateral pelvic roentgenogram, Jacobs was enabled to establish the normal inclination of the pelvis and pelvic planes. The difference in the figures here

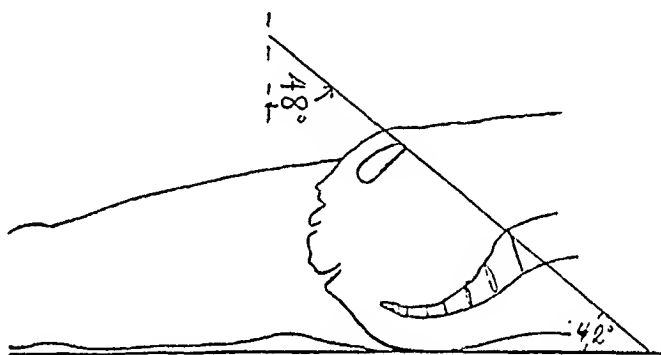


Fig. 1.—The inclination of the inlet is 42 degrees in recumbent posture. Should one deduct this angle from 90 degrees the habitual inclination (48 degrees) would be determined.

quoted, taken from his series and those of the pelvis that have been generally accepted as normal, are quite marked (Fig. 2), and give a better understanding of why one may encounter trouble in a pelvis of normal size due to faulty inclination, which had not been suspected. It appears that the old methods of detection were inaccurate, although it is possible that differences in manner of living, rickets, exercise, and other factors may have played a part.

All of these patients were examined in the recumbent posture with legs extended and separated, being supported on tables specially constructed for the purpose. Although a difficult position in which to perform a pelvic examination, the inclination was thus obtained in the horizontal posture. This was selected as the standard position because changes in posture caused variations in inclination of the pelvic planes.

The average inclination of the inlet Jacobs found to be 42 degrees, as compared with 30 degrees accepted by Cragin (Fig. 2). The habitual inclination of the normal pelvis, therefore, is 48 degrees instead of the 60

Untersuchungen über Puerperaleklampsie, Leipzig, 1893. (9) *Lubarsch*: Die Puerperaleklampsie, Ergebnisse d. Allgemeinen Pathologie von Lubarsch und Ostertag 1: 1896. (10) *Konstantanovitch*: Beitr. z. path. Anat. u. z. allg. Path. 40: 1907. (11) *Ceclen*: Virchows Arch. 210: 1910. (12) *Acosta-Sison*: AM. J. OBST. & GYNEC. 22: 35, 1931. (13) *Davidson*: Edinburgh Med. J. 24: 46, 1931. (14) *Nevermann*: Zentralbl. f. Gynäk. 16: 617, 1922. (15) *Mylius*: Zentralbl. f. d. ges. Ophth. 20: 199, 1929. (16) *Wagener*: J. A. M. A. 101: 1380, 1933. (17) *Corwin and Herrick*: AM. J. OBST. & GYNEC. 14: 783, 1927. (18) *Peckham*: Bull. Johns Hopkins Hosp. 45: 225, 1931. (19) *Berman*: New England J. Med. 203: 361, 1930. (20) *Blumgart and Ernstenc*: J. A. M. A. 100: 173, 1933. (21) *Starling*: The Production of Lymph. Principles of Human Physiology, ed. 5, Philadelphia, 1930, Lea & Febiger, Chap. 37, p. 822. (22) *Braunmühl*: Zentralbl. f. Gynäk. 53: 1175, 1929. (23) *Jaffé*: Zentralbl. f. Gynäk. 51: 1387, 1927. (24) *Benoit*: Ztschr. f. d. ges. Neurol. u. Psychiat. 131: 602. (25) *de Fries*: Arch. Neurol. & Psychiat. 25: 227, 1931. (26) *Rowntree*: J. Pharmacol. & Exper. Therap. 29: 135, 1926. (27) *Anselmino and Hoffmann*: Arch. f. Gynäk. 147: 597, 1931. (28) *Hurwitz and Bullock*: Am. J. Med. Sc. 189: 613, 1935.

THE INJECTION TREATMENT OF VARICOSE VEINS IN PREGNANCY*

C. Z. NICHOLAS, M.D., SANTA BARBARA, CALIF.

(From the Margaret Hague Maternity Hospital)

IN 1579 Ambroise Paré voiced his objection to the treatment of varicose veins in pregnancy: "Women with child are commonly troubled with them by reason of heaping together of their suppressed menstrual evacuation. It is best not to meddle with such as inveterate for of such being cured there is to be feared a reflux of the melancholy blood to the noble parts, whence there may be danger of malignant ulcer, a cancer, madness or suffocation."

In the past six or eight years there has been an increasingly general acceptance of the safety and satisfactoriness of the treatment of varicose veins by injection in the nonpregnant. Yet Paré's idea concerning the treatment of varicose veins in pregnancy has not changed much. Even as late as 1929, Douthwaite, and in 1932 Maingot, noted pregnancy as a contraindication to the injection treatment. Jacques Forestier in 1928 joined in this objection, basing his opinion on the assumption that the varices accompanying pregnancy are due to transitory troubles of the endocrine glands, which disappear after delivery. E. T. Payne, likewise, objects to the injection treatment of varicose veins in pregnancy, but is willing to make exception in patients in whom the veins are giving rise to severe discomfort.

*This constitutes a preliminary report only; to September 15, 1935, 1,775 injections have been given to 341 patients; a complete analysis of the work in this special clinic is in preparation.

This is submitted to the Faculty of Gynecology-Obstetrics of the Graduate School of Medicine of the University of Pennsylvania in partial fulfillment of the requirements for the degree of Master of Medical Science (M.Sc. [Med.]) for graduate work in Gynecology-Obstetrics.

The inclination of the symphysis as related to the inclination of the diagonal conjugate is the major factor in determining the length of the true conjugate. For, included between these two diameters, because of its importance, is an angle designated as the obstetric angle. The three diameters together, namely, the true, the diagonal conjugate, and the symphysis pubis, form the obstetric triangle (Fig. 2). The average obstetric angle was 77 degrees as compared to 61 degrees in the pelvis usually accepted as normal. A small angle will subtend a small true conjugate, while a large angle will include a large true conjugate (Fig. 2).

Engagement of the fetal skull may fail to occur in cases of marked faulty inclination even though the pelvic measurements are ample. The posterior parietal eminence usually presents below the promontory, while

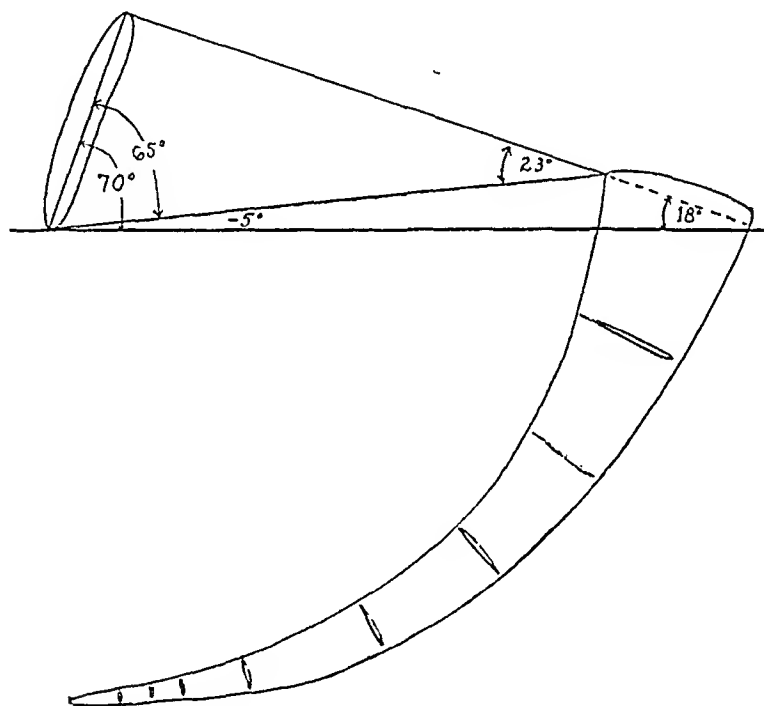


Fig. 3.—It is very unusual for promontory to be situated above the level of the lower border of the symphysis. Such cases present poor inclination of the inlet. Here inclination of the inlet is 18 degrees as compared with 42 degrees for the average.

the anterior parietal boss may be found protruding in front of the symphysis (Fig. 4). The longitudinal suture occupies the transverse diameter of the inlet, but in some cases the occiput may be slightly anterior or posterior, depending upon whether the available transverse diameter approaches the symphysis or promontory. Naturally, the amount of overriding depends upon the size of the head and the degree of inclination of the inlet. According to Sturmdorf² it is a fundamental law in dynamics that the direction of a given force or body impelled by such force, impinging against a resistant plane, becomes deflected in a fixed and definite direction, the degree of deflection being governed by the angle of the resisting or deflecting plane. In an abdominal cavity of normal skeletal configuration, a true vertical, in contact with the cen-

ally occur. Numerous attempts to treat varicosities by administration of endocrine gland preparations have been made, but so far no definite results have been obtained.

One of the most important objections offered against the injection treatment of varices is the possibility of embolus formation. Yet fluoroscopic examination of the veins after injection of lipiodol as opaque medium by Magnus, Sickard and McPheeters has definitely established the fact that the flow of blood in the varicose veins is downward toward the feet. The fact largely precludes the possibility of embolus formation because the tendency is to force the thrombus downward instead of aspirating it toward the heart.

The other most important objections are the possibility of extension of the thrombus formed after the injection and development of acute infectious thrombophlebitis. From the experience of many surgeons it has been definitely found that the thrombus formed by the injection treatment has no tendency to extend as often happens in infectious thrombus, and the occurrence of acute thrombophlebitis is encountered actually less frequently in patients treated by the injection method than in those not so treated.

In our group of 100 patients only one developed aseptic thrombophlebitis following the injection, which was not accompanied by rise in temperature and subsided shortly without producing any untoward effect. On the other hand, three patients were observed by us in the hospital with acute thrombophlebitis following delivery, all of whom had suffered from marked varicosities and refused treatment previous to confinement. In the entire group of treated patients there was no thrombophlebitis observed before, during, or after delivery, except the one aseptic reaction noted above.

Anatomic observations have shown that the process called "venitis" by Sickard and Forestier, caused by chemical irritation of the veins, is entirely different from the infectious process or phlebitis. Venitis is a localized process with formation of very adherent clot, but with no general reaction such as pain or edema, and the final result is the formation of an atrophied cord. In phlebitis there is edema, the clot is loose, and atrophy does not take place. As a result embolism is very probable, while in venitis it is very rare. If embolism should occur, and could be attributed to the sclerosing solution solely, it would happen shortly after injection.

TECHNIC

In establishing diagnosis in our group of patients at the Margaret Hague Maternity Hospital, it was found almost unnecessary to subject them to the Trendelenburg test as the condition was self-evident. The only test we used was the application of a linen mesh bandage which the patient was instructed to use for one week previous to the injection treatment, removing it at night and reapplying it on arising. This simple measure not only made the patient more comfortable but also enabled us to

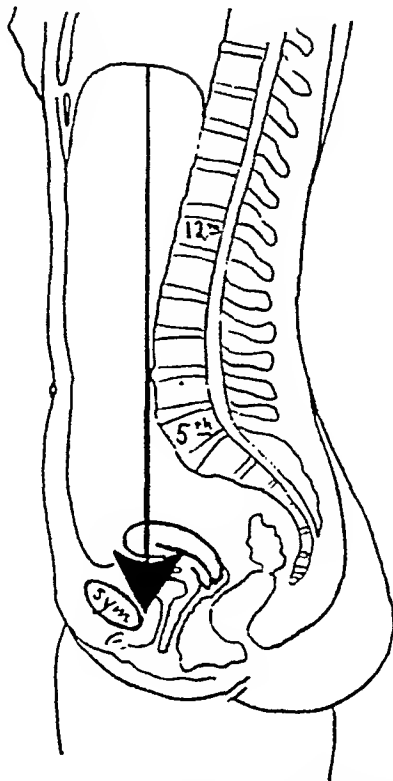


Fig. 5.—The direction of a body (presenting part), impelled by a given force (of expulsion), impinging against a resistant plane (symphysis), becomes deflected, the degree of deflection being governed by the angle of the resisting plane. (Illustration from Sturmdorf, *Gyneplastic Technology*, p. 102.)

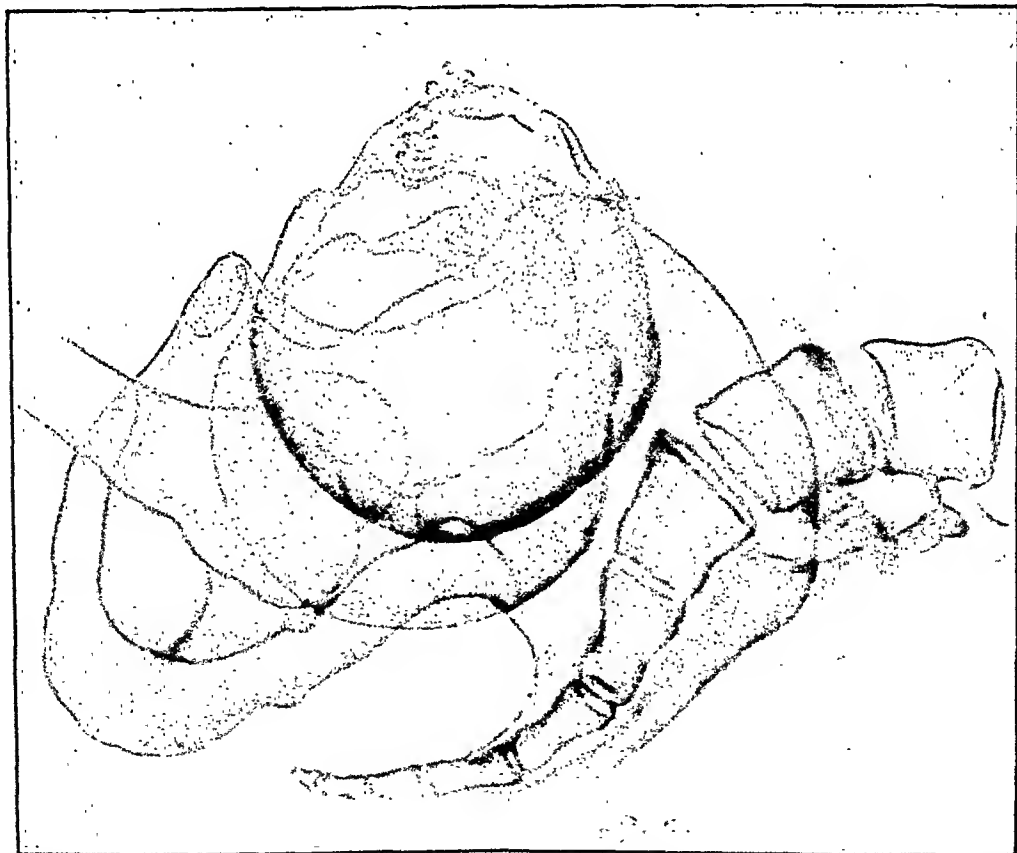


Fig. 6.—Engagement effected by lateral flexion, the anterior parietal eminence passing behind upper border of symphysis, while posterior parietal eminence slips above sacral promontory. After engagement labor progresses by normal mechanism.

The use of preparations of quinine might represent some danger in pregnancy, though in the tropics large doses of quinine are used without any untoward effect, and Greene reported a series of 25 pregnant women who were very successfully treated with quinine urethan.

In treating slough we found that simple strapping with heated adhesive plaster in narrow straps overlapping one another, but not encircling the limb altogether, shortened the healing process considerably, and what is more important, completely relieved the patients from pain and discomfort. Otherwise, the treatment of slough is purely surgical.

As far as contraindications are concerned it seems there are only cardiorenal decompensation and infectious thrombophlebitis, both requiring more or less complete rest in bed. This does not comport with the injection treatment as here it is essential to keep the patient up and about even in case of developed complications, as perivenitis, so as to prevent the remote possibility of embolism by aspiration from the great saphenous system.

The following tables represent our group of 100 patients treated with the injection of dextrose and sodium chloride solutions:

Past history of duration of varicose veins:

1 month 6 patients	1 year 2 patients	9 years 2 patients
2 months 8 patients	2 years 14 patients	10 years 6 patients
3 months 9 patients	3 years 8 patients	11 years 1 patient
4 months 1 patient	4 years 7 patients	12 years 3 patients
5 months 4 patients	5 years 8 patients	13 years 1 patient
6 months 5 patients	6 years 2 patients	15 years 1 patient
7 months 3 patients	7 years 2 patients	19 years 2 patients
	8 years 4 patients	20 years 1 patient

The months of gestation at which time the treatment was instituted were:

Third month	5 patients
Fourth month	5 patients
Fifth month	21 patients
Sixth month	25 patients
Seventh month	27 patients
Eighth month	15 patients
Ninth month	2 patients
Total	100 patients

As to the number of pregnancies the patients in our group were divided as follows:

Gravida 1	3
Gravida 2	23
Gravida 3	31
Gravida 4	16
Gravida 5	11
Gravida 6	7
Gravida 7	2
Gravida 8	2
Gravida 9	4
Gravida 11	1
Total	100

Location of varicosities:

Leg	96
Thigh	55

not yet published greatly simplifying the procedure, so that anyone with diligence can practice pelvimetric roentgenography and at the same time observe pelvic inclination as evidenced by the relationship of the inlet to the spinal column, as well as measuring the size of the head and estimating its ability to engage. Second, because the picture obtained as compared to other modifications that have been tried, is the clearest, and distortion and asymmetry are the least, if at all present.

METHOD

A modern x-ray table which rotates from the usual horizontal to a vertical position is used. The patient stands in her habitual posture with one side in apposition with the table top, and the film with Bucky diaphragm, which is incorporated in the

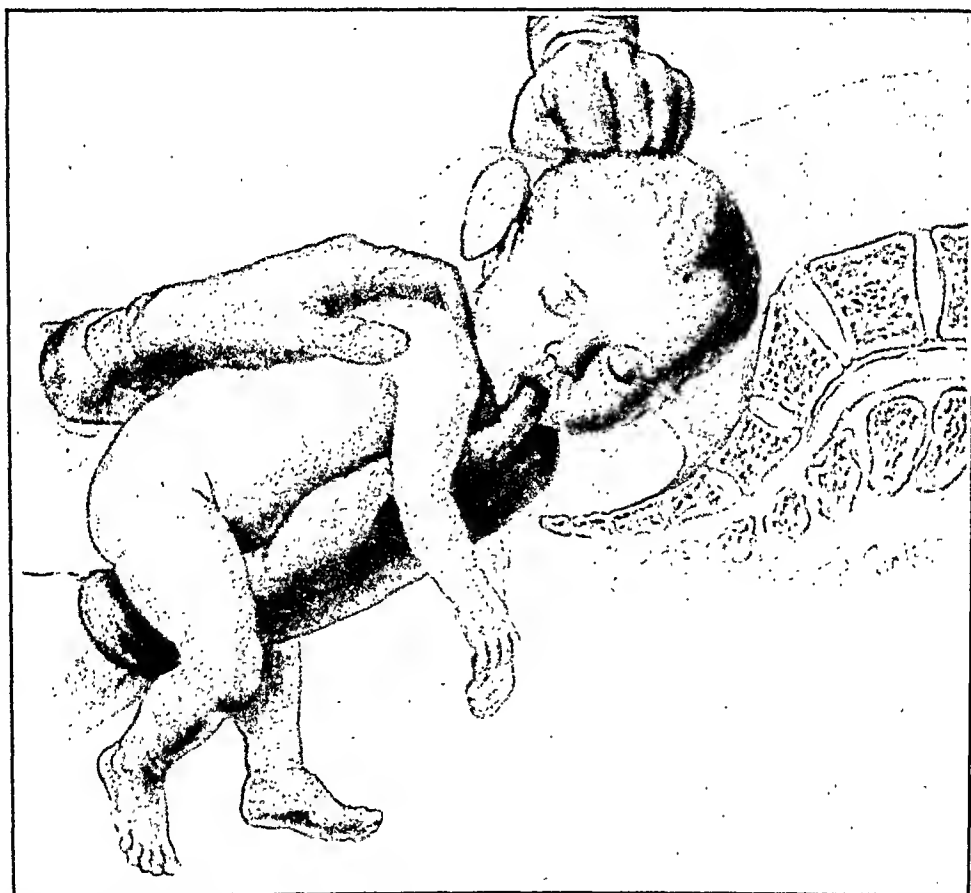


Fig. 8.—Faulty inclination of inlet may prevent engagement of the after-coming head. Backward pressure on anterior parietal bone frequently causes head to enter inlet.

table, is shifted to the proper height so as to include the desired view. The usual belt of canvas which the roentgenologist uses is placed in position, firmly securing the patient's hip to the table. The tube is so placed that the center ray reflected from the target, will strike a point one inch posterior to the anterior inferior iliac spine. This point, in practically all cases, denoted the middle of the true conjugate diameter, making the picture a suitable one from which to measure the length of the true conjugate accurately, when the dotted scale or method of Roberts is used.

Faulty inclination should be recognized before the onset of labor. Regardless of the degree of inclination, the patient should be given a test labor since acute flexion of the thighs improves the inclination of the inlet as well as the symphysis pubis, this attitude should be encouraged during labor. Lying on either side with

CONCLUSIONS

1. Relief of pain and discomfort was obtained by an easy and comparatively harmless procedure.

2. This contributed to the prevention of thrombophlebitis after delivery by eliminating stagnation of blood stream in patent vessels which evidently predisposes to this complication.

3. Great appreciation in general was shown by the patients. Many declared that prior to the injections they had been hardly able to get about and later they were able to do their household duties with comfort.

4. During pregnancy the veins are usually prominent and easily treated; although they usually decrease in size and prominence after pregnancy, they certainly have a tendency to reappear during later pregnancies. This liability is lessened by such treatment.

Acknowledgment is appreciatively made of the interest and help of Dr. Samuel A. Cosgrove, Medical Director of the Hospital, Dr. Julius Siegler, Chief of the Varicose Vein Clinic, and other members of the medical and nursing personnel of the Margaret Hague Maternity Hospital in making this study.

REFERENCES

- (1) *Alvarez, A. C.*: AM. J. OBST. & GYNEC. 19: 33, 1930. (2) *Douthwaite, A. H.*: The Injection Treatment of Varicose Veins, Chicago, 1929, Medical Book Co. (3) *Forestier, J.*: J. A. M. A. 90: 1932, 1928. (4) *Gellhorn, G.*: AM. J. OBST. & GYNEC. 16: 723, 1923. (5) *Gray, Henry*: Anatomy of the Human Body, Philadelphia, Lea & Febiger. (6) *Greene, J. J.*: J. Obst. & Gynec. Brit. Emp. 39: 601, 1932. (7) *McPheeters, H. O.*: Lancet 49: 243, 1929. (8) *McPheeters, H. O.*: Lancet 51: 589, 1931. (9) *McPheeters, H. O.*: Trans. Obstetrics, Gynecology and Abdominal Surgery, American Medical Association, 1931. (10) *Maingot, R. H.*: Practitioner 129: 174, 1932. (11) *Noble, G.*: Wien. klin. Wchnschr. 47: 337, 1934. (12) *Payne, R. T.*: Lancet 2: 313, 1929. (13) *Ritchie, A.*: Trans. Edinburgh Obstetrical Society, pp. 157-164, 1932-3. (14) *Sickard, J. A., and Gaugier, L.*: Masson et Cie, 1927.

1421 CHAPALA STREET

Saito, T.: Lactation and Re-Onset of Menstruation, Jap. J. Obst. & Gynec. 18: 63, 1934.

Saito found that in Japanese women menstruation returned in 72 per cent of lactating women. Bleeding returned within three months in 29.4 per cent, whereas between four and twelve months it returned in 55.9 per cent. According to the reports concerning European and American women, menstruation reappears within three months after delivery in about 33 per cent of all cases. In Japan, however, the average figures are 18 per cent within the first two months after delivery and 26 per cent within the first three months. With the prolongation of lactation, the menses have a tendency to be delayed. The average interval was 3.7 months. Patients with a small amount of milk in the breasts had an earlier recurrence of the menses.

J. P. GREENHILL.

the future. Such abnormal cases were not included in the series of eighty cases used for the purpose of determining the inclination of planes in the average pelvis.

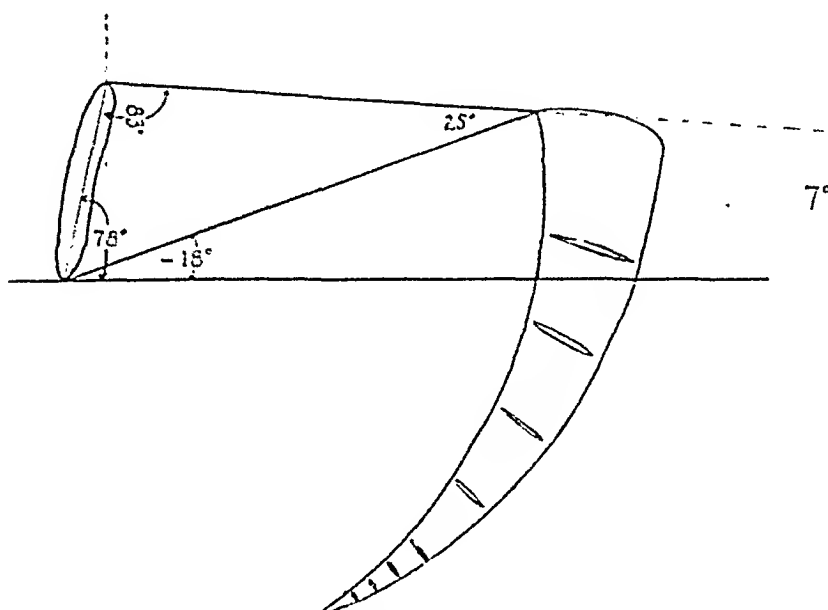


Fig. 10.—The most unfavorable type of inclination. The forces of expulsion have a tendency to drive the presenting part over the symphysis instead of into the inlet. (Postural treatment enabled this patient to deliver normally.)



Fig. 11.—This roentgenogram shows faulty inclination of inlet. Engagement failed to occur and cesarean section was performed.

Graves,¹⁰ however, seems to favor the toxin theory. He states that the "general tendency is to ignore causal relation except in long-standing cases with anemia."

Certain vasomotor symptoms are sometimes observed in women who have fibroids, such as tremors, hot flushes, dizziness, and tachycardia, which have seemed to substantiate the claim for a toxic influence in fibroid tumors. These symptoms are, however, frequent in women without fibroids. "Notwithstanding the present trend to disassociate myomas from heart lesions, and to discard the toxic theory of uncomplicated fibroids, it is well to reserve judgment until the facts are better established. The profound effect which fibroids without local symptoms often have upon the organism of women, and especially on her nervous system, certainly suggest that the older theories may not be without basis."

And Arthur H. Curtis⁶ states, "my personal reaction is that the heart muscle tends to develop degenerative changes due to systematic absorption of toxic waste products which accumulate in the depths of the tumors, notably in those with poor circulation and degenerative changes." This view is shared by Shedden¹⁶ who feels there is "at least a suspicion of tumor intoxication."

ANALYSIS OF MATERIAL

Thirty consecutive patients with proved fibroids were studied both clinically and electrocardiographically. In contrast with this group, thirty other patients were chosen from different surgical services, who were operated upon for various pelvic conditions other than fibromyoma of the uterus.

In the fibroid group it was found that 13 (43.3 per cent) presented no cardiac symptoms, 9 (30 per cent) had symptoms of slight cardiac embarrassment, chiefly dyspnea on exertion, while 8 (26.7 per cent) complained of moderate to marked cardiac insufficiency, characterized by dyspnea, palpitation, precordial pain, dizziness, and ankle edema.

The electrocardiograms of these 30 patients showed 15 normal tracings, 3 had left predominance, 9 showed evidence of questionable or definite myocardial degeneration, and 3 had evidence of coronary disease. Of the 9 patients who showed mild or moderate cardiac degeneration, 2 had nephritis with hypertension; 2 had nephritis without hypertension; 1 had advanced nephritis with pulmonary tuberculosis. Thus 5 patients had definite lesions which may have accounted for the cardiac damage.

The electrocardiograms of the nonfibroid cases showed the following: 15 were normal; 7 had left predominance; 7 showed definite myocardial degeneration; while 1 had coronary sclerosis.

It will be seen from Tables I and II, that in one-half the cases there was demonstrable neither clinical nor electrocardiographic evidence of cardiac disease. In the

TABLE I. CLINICAL SYMPTOMS IN 30 FIBROID CASES

No cardiac symptoms	13
Slight symptoms (exertion dyspnea)	9
Moderate symptoms (dyspnea, ankle edema, precordial pain, and palpitation)	8

TABLE II. ELECTROCARDIOGRAMS IN 30 FIBROID CASES

Normal	15	50%
Left axis deviation	3	10%
Questionable evidence of myocardial damage*	3	10%
Definite evidence of myocardial damage*	6	20%
Aberration of S-T interval (Coronary disease?)	3	10%

*Low or flat T waves and/or splintering of QRS complexes; low amplitude QRS.

3. The inclinometer and x-ray afford absolute knowledge of pelvic inclination.

4. Fortunately exaggerated forms are not common, but they should be readily recognized and accurately studied.

5. Several easy methods of noting inclination are enumerated.

6. The rôle of inclination in the mechanism of engagement and delivery is discussed.

7. The practical value of postural variations in labor is considered, as well as the application of pressure in the proper direction to the overriding head.

8. A plea is made for the test of labor.

9. Failure to engage because of faulty inclination when treated with forceps or version often ends disastrously. Cesarean section should be seriously considered.

10. Preliminary reference is made to a simple, clear, accurate, and inexpensive method of lateral pelvic roentgenography for studies of habitual inclination and mensuration.

REFERENCES

(1) *Jacobs, J. Bay*: South. M. J. 25: 828, 1932. (2) *Idem*: AM. J. OBST. & GYNEC. 15: 689, 1928. (3) *Idem*: South. M. J. 22: 321, 1929. (4) *Sturmdorf, Arnold*: Gynoplastic Technology, Philadelphia, 1919, F. A. Davis & Co., pp. 101 and 103. (5) *Jacobs, J. Bay*: AM. J. OBST. & GYNEC. 28: 227, 1934.

DISCUSSION

DR. LUCIUS A. WING, New York, N. Y.—The work that Dr. Garnett has brought before us is timely in view of the active interest existing at present in pelvic studies made possible by roentgenologic methods. I have not used Dr. Jacobs' inclinometer, and my experience with this entire subject has been largely from the side of clinical obstetrics. At the New York Hospital, however, several of us have been working for the past year with the precision stereoscope devised by Dr. Caldwell and Dr. Moley. We have been impressed with its value as a means of arriving at a more accurate conception of the variations in pelvic conformation.

Lateral roentgenograms under proper conditions, as Dr. Garnett has indicated, show that considerable variation exists in the inclination of the pelvic inlet. The steepest inclination is observed in the type of pelvis classified by Caldwell and Moley as the anthropoid type. In this type of pelvis the sacral promontory lies at a high level in respect to the upper border of the symphysis. The latter is deep and wide in this type of pelvis. In the android or masculine type the pelvis is deep with side walls which often converge, and the inclination of the plane of the inlet is not characteristic as in the anthropoid type. Usually the top of the symphysis and the sacral promontory are more nearly on the same plane.

Many abnormal labors occur in these two types of pelvis, therefore their recognition is important. As in the case which Dr. Garnett has reported, the inclination of the pelvic inlet may well influence engagement of the presenting part, especially if the pelvic type is unfavorable or if any disproportion is present.

DR. LEROY A. CALKINS, KANSAS CITY, MO.—Dr. Garnett has told us exactly how to estimate the pelvic inclination, but he still has not told us how we may then

cent succumbed after operation, the cause of death being a low grade peritonitis and mesenteric thrombosis. Two transfusions had been given prior to operation, and the immediate postoperative course was good.

Endocrine Changes.—We have pointed out that the average age of these patients was forty-one years. This, in our climate, corresponds in most cases practically to the onset of the menopausal syndrome. At this time of life, signs and symptoms of myocardial fatigue and insufficiency frequently begin to make themselves manifest.

It is at this time also that other degenerative diseases usually begin to appear, including nephritis, arteriosclerosis, and its frequent concomitant hypertension. It is worthy of note that 8 patients in this series had an elevated blood pressure, varying from 10 to 35 points above the normal for the age.

COMMENT

Critical analysis of the material would seem to lead to the conclusion that uterine myomas do not produce any significant changes on the cardiovascular apparatus.

Comparison with an equal number of patients of the same age groups admitted to the surgical service on account of pelvic disorders showed, on clinical and laboratory examination, a surprising similarity of symptoms and signs. That the cardiac damage evident in the patients with the myomas was not due to their presence is suggested by the concomitant association of other exciting disease and is further strengthened by finding similar impairments in the nonfibroid group.

It is significant that no patient died of any cardiac complication despite the presence of coronary artery disease in three and other definite myocardial damage as noted above.

REFERENCES

- (1) *Anspach, Brooke M.*: Gynecology, Philadelphia, 1927, J. B. Lippincott & Co.
- (2) *Bandler, S. W.*: Medical Gynecology, Philadelphia, 1911, W. B. Saunders Co.
- (3) *Bell, W. Blair*: Principles of Gynecology, Baltimore, Williams & Wilkins Company.
- (4) *Bland, P. Brooke*: Gynecology, Philadelphia, 1927, F. A. Davis Co.
- (5) *Cameron, S. J.*: Manual of Gynecology, London, 1925.
- (6) *Curtis, Arthur Hale*: Text-Book of Gynecology, Philadelphia, 1930, W. B. Saunders Co.
- (7) *Dudley, E. C.*: Principles and Practice of Gynecology, Philadelphia, 1902, Lea Brothers & Co.
- (8) *Fenwick, H.*: Lancet 2: 1888.
- (9) *Fleck*: Arch. f. Gynäk. 70: 1904.
- (10) *Graves, W. P.*: Gynecology, Philadelphia, 1929, W. B. Saunders Co.
- (11) *Huggins, R. R.*: Surg. Gynec. Obst., December, 1919.
- (12) *Kelly, Howard A.*: Gynecology, New York, 1928, D. Appleton & Co., p. 502.
- (13) *Kelly and Cullen*: Myomata of the Uterus, Philadelphia, 1909, W. B. Saunders Co.
- (14) *McGinn, J. A.*: Trans. Am. Gynec. Soc. 38: 482, 1913.
- (15) *Polak, J. O.*: Manual of Gynecology, Philadelphia, 1922, Lea and Febiger.
- (16) *Sheddén, L. L.*: Surg. Gynec. Obst., April, 1920.
- (17) *Theilhaber, A.*: Monatschr. f. Geburtsh. u. Gynäk. 32: 1910.
- (18) *Webster, J. C.*: Am. Med., p. 401, 1905.
- (19) *Wilson*: Trans. Obst. Soc., London 42: 176, 1900.
- (20) *Winter, G.*: Ztschr. f. Geburtsh. u. Gynäk. 55: 1905; 57: 8, 1906.

hand, one may encounter cases of more favorable inclination that will not respond so nicely to postural treatment during labor.

Dr. Garnett calls attention to the various simple methods which we routinely use, for learning pelvic inclination in any case. To determine the inclination in a technical manner necessitates the use of the obstetric inclinometer, and with this instrument the height and inclination of the symphysis and the length and inclination of the diagonal conjugate would be noted. A pelvigram is then drawn, as explained in my previous articles, and instantly, with the aid of a protractor, the inclination of the inlet would be recorded accurately. I wish finally to call attention to two facts. First, that in my study of 80 pelves of living women, I have found that the average inclination is more favorable than heretofore recognized; and, second, that the size of the true conjugate in the average pelvis is larger than the previously accepted true conjugate (as related to the length of the diagonal conjugate). Thus a more favorable inclination, and a larger than expected true conjugate, account for the preponderance of normal deliveries in borderline pelves.

DR. W. A. SCOTT, TORONTO, CANADA.—I would like to ask Dr. Garnett just at what time during pregnancy his measurements of the pelvic inclination were taken? At our clinic Dr. Goodwin some years ago devised a pelvimeter and has been taking measurements on a considerable number of patients. He advises that during the progress of pregnancy the pelvic inclination changes very markedly, as much as 17 degrees sometimes. I wondered whether Dr. Garnett's measurements were taken only at one particular time.

DR. WILLARD R. COOKE, GALVESTON, TEXAS.—Attention may be called to faulty inclination by the fact that in cases with normal measurements engagement fails to take place in the way one expects. Very often where the pelvis is normal, flexion of the spine to bring the pelvis into line will permit the engagement of the head, which might not otherwise be possible. It is very commonly necessary to do this in order to shorten the inlet stage of labor. It might be regarded as a part of the test of labor in borderline cases. With the patient in the Walcher position the inclination of the pelvis will be made worse. The reverse of the Walcher position will often bring about engagement and descent through bringing the upper part of the axis of the pelvis into line with the thrust, in spite of a possible slight reduction in the anteroposterior diameter of the inlet.

DR. GARNETT (Closing).—I wish to stress the importance of having the patient in the correct position and also the importance of proper manipulation to overcome the difficulty encountered by faulty pelvic inclination.

On account of the impossibility of making a correct prognosis in these cases, I wish also to urge a test labor, because by manipulation and correct position the majority of these cases can be handled successfully.

The eighth month is the safest time to start to estimate inclination and decide the possibility of successful manipulation at the time of birth. It is impracticable to take pictures in all cases as a routine measure, so accurate pelvimetry is out of the question. The x-ray is, however, important and careful study should be made before labor starts if any suspicion of abnormal inclination has been aroused by the simple rules suggested.

I was asked to see a patient recently by one of the junior men of the staff. The woman had been in labor for twenty hours, and he could not understand why the head would not engage. The membranes had been ruptured for several hours. She was found to have a very badly inclined pelvis. We flexed the thighs as tightly as possible, and the head was pushed backward against the promontory. It slipped through and the baby was born in twenty minutes. If, after manipulation and position, the head does not properly engage, the woman should not be subjected to traumatic delivery, but a cesarean section should be performed.

The ovary is practically an isolated organ, yet is subjected to various types of bacterial invasion. The corpus luteum offers a favorable medium for the growth of organisms.

Pozzi, and others, correctly taught that a follicular cyst or a yellow body favored infection and all abscesses were thought to be luteinic in character.

Excellent contributions on pyo-ovarium have been made by French, German, Spanish, and Italian writers; prominent among them may be mentioned the names of Fry, Manges, Doleris, Wertheim, Langer, Watjen, and others, who described the anatomy of the luteinic abscess. Lampert, Ziegler, and Cohen described the tuberculous abscess. Orthmann and Pfannenstiel contributed to the pathology of pyo-ovarium. Ohman, in 1913, operated seven days after a normal delivery upon a woman, who presented acute pelvic symptoms with a mass to one side, which proved to be a streptococic pyo-ovarium. Chomé, in 1919, described the anatomy and histology of a luteinic abscess, with its limiting luteinic membrane, and claimed that all ovarian suppurations were luteinic. R. Meyer and Aschoff contradicted the luteinic theory as being responsible in all cases. Tenani, in 1923, reported the rupture of a pyo-ovarium during the second stage of labor, which was followed by a streptococic peritonitis and death. Rudolph and Keek, in 1924, reported a suppurative ovarian cyst due to the paratyphoid bacillus. Kriwski, Windesch, Bland-Sutton, Hurst, Wiener, and others have reported finding a suppuration of an ovarian cyst due to the typhoid bacillus. McKinney, Stewart and McClure, in 1934, reported a suppurative ovary following mumps.

The available English literature is meager upon the subject of the pyo-ovarium or the tubo-ovarian abscess as a separate pathologic entity. After observing for several years the difference in the behavior of the two conditions from the usual pelvic infections, I have been prompted to make the present report.

The mode of infection of the ovary when due to the gonococcus follows the path of the tube. If a recent dehiscence of the graafian follicle has occurred, appropriate opportunity is afforded for the growth of the gonococcus. The fimbrias become sealed around the corpus luteum closing off the pelvic cavity from further infection but continues its destructive effects upon the ovary. The pus in such a case usually becomes sterile and the laboratory findings, as well as the clinical picture, are not so severe as in a pyo-ovarium, unless secondarily infected. If a co-existing infection is present, it progresses in a similar manner as the pyo-ovarium. While the staphylococcus, colon, or other bacteria may be present, 95 per cent of pyo-ovariums are due to the streptococcus. Infection in pyo-ovarium may be via the hematogenous route, e.g., from variola, parotitis, typhoid, influenza, etc., or by contiguity of tissue from other infected organs.

REPORT OF CASES

CASE 1.—J. S., married, para ii, aged twenty-eight years, colored. Ill for several months. Entered the Memphis General Hospital, June 13, 1934, complaining of pain in the left side, leucorrhea, and amenorrhea for nine months. Preoperative days in hospital, forty-two. Pyorrhea and bad tonsils were the only infections

The incidence of persistent or arrested posterior positions is also vari-ously reported. All authorities do agree, however, that "a great many" or a majority of primary posterior positions will rotate spontaneously, so that the proportion of them which remains persistent is relatively small, the estimations varying from 20 per cent to 40 per cent of the total. In the series of 15,000 cases referred to above it was 65 per cent. As, however, this is based on a total incidence observed at various stages of labor, rather than on *primary* incidence, its relation to the latter would be very much smaller. In a personal series of 4,810 cases it was 38 per cent.

The etiology of primary occipitoposterior position is not clearly understood. The variety of factors which different writers have stressed from time to time as most important, and which all authors admit as possibly contributing causes, exhibit a lack of unanimity of opinion. There is general unanimity, however, as to the importance of *gross* deviations from normal of the bony pelvis in determining occurrence of both primary and persistent occipitoposterior positions. Thoms stresses relative or actual diminution of the transverse diameter of the inlet and Caldwell and Moloy state that this type of deformity as exhibited in their "android" pelvis *necessarily* tends to cause posterior engagement; many authors mention funnel pelvis as interfering with spontaneous rotation; Vaux recognized definite pelvic contraction in 74 per cent of occipitoposterior positions; Hanson in 70 per cent; Caldwell in 30 per cent, and I found 30.9 per cent in my private series; other writers note the importance of deflexion of the head in the etiology, but deflexion in turn depends on such pelvic asymmetry as disturbs the equality of pressure on the ends of the occipitosincipital lever.

But besides these grosser bony abnormalities, if such intangible factors as variation in torsion of the uterus; modifications in flexibility of the head, posture of the fetus in utero, tone of the abdominal wall, and many others, may be conceived as determining departure from normal, it may be just as readily conceived that very slight and perhaps equally intangible deviation in pelvic bony symmetry or in cephalopelvic proportion, are of even greater importance. In this connection, Thoms says: ". . . . There are many slight or moderate variations from the normal which remain unrecognized." So that I am led inevitably to the conclusion that the primary occurrence of occipitoposterior position, as well as its abnormal persistence, necessarily implies the existence of some degree of bony pelvic asymmetry, or deformity, or cephalopelvic disproportion.

If such bony asymmetry or disproportion is of slight degree only, involving entirely, or most importantly, the inlet of the pelvis, one would expect that in spite of the relatively unfavorable relation of the head to the inlet, it would be capable of spontaneous evolution in its passage

pelvic infection, being familiar to all, are not under consideration. If a tubo-ovarian suppuration results as a complication, the pain usually continues on one side (may be bilateral), is more persistent, and fails to respond to treatment as does the usual gonorrheal infection. The temperature continues for a longer time, the white count remains higher; however, both may in time become normal. The sedimentation time continues fast indefinitely, due to infection and to metabolic changes.

In over 10,000 sedimentation tests (University of Tennessee Clinic), it has proved to be of more value from a diagnostic and prognostic viewpoint than any other laboratory procedure. After the exudate has regressed, there remains a fluctuating mass somewhat gourdlike in shape. A large mass, if present, may regress in time, but does not entirely disappear. A rise in temperature, a fast pulse, leucocytosis, a quick sedimentation time, and a painful pelvic mass are present in both the tubo-ovarian abscess and pyo-ovarium.

When the etiology is neisserian, a leucorrhea and other stigmas of gonorrhea are present. Menorrhagia, dysmenorrhea, pelvic pain, etc., may continue throughout the course of either disease. Sterility is often a symptom in gonorrheal infection. If both ovaries are destroyed by infection, as in a case previously reported, amenorrhea may be a symptom.

In a tuberculous ovarian abscess the symptoms are usually insidious in nature, often occurring in the virgin with systemic signs of tuberculosis elsewhere, as the ovary is rarely, if ever, primarily infected. The abscess harbors the tubercle bacillus and at times a mixed infection is present. The abscess may rupture and produce a peritonitis, or develop a fistulous opening into some adjacent organ. If a mixed infection is present, the laboratory findings are of little aid in determining the type of pathology at hand. If pulmonary tuberculosis is diagnosed and a mass is present in the pelvis, without a history of other types of infection, a probable diagnosis may be made.

In postabortive and puerperal infections the symptoms are more abrupt and severe in type. A bilateral cellulitis is usually present at first producing the "frozen pelvis"; therefore, the ovary cannot be palpated until sufficient time has elapsed for absorption of the exudate. If the ovary is left with an abscess formation, the general, as well as the local, symptoms do not abate. The white count remains increased, and the sedimentation time is usually under thirty minutes. Pain and tenderness are present and the dysfunction of menstruation persists.

A pyo-ovarium resulting from a suppurative appendix, peritonitis, or a ruptured viscus, etc., the history and clinical findings are different. The "frozen pelvis" is absent, and the mass is usually unilateral. A history of gonorrhea and pregnancy is absent, but the history of appendicitis, peritonitis, etc., can be obtained. Where an infected fibromyoma, carcinoma, or an instrumentation is responsible in pyo-ovarium,

thusiastic as to the value of a pressure pad so bound or strapped against the anterior shoulder as to rotate it toward the opposite side, thus turning the whole fetal ellipse, including the head, to better relationship with the inlet. He makes the extreme statement that he has not failed in success by this method. If other experience bears out his success, the value of so simple a device should be recognized, and it should be universally employed. If my own enthusiasm does not match his, I must perhaps plead guilty to insufficient diligence in its use.

The treatment after labor has commenced serves to distinguish two trends of thought, the more conservative one shared by the majority of writers, and a more radical one, of which perhaps Arthur H. Bill is the best-known exponent. Certain of the premises of the latter are incontrovertible. He says that it is equally faulty to interfere too early, i.e., in the first stage of labor, or to wait too long after full dilatation of the os for spontaneous rotation to occur. This statement might well be generally subscribed to. It is in the definition of "too early" and "too long" that the divergence between radicalism and conservatism may be discerned. That Bill is relatively radical is revealed in his caution in stating that he offers his scheme of management for trained obstetricians only, and not as "a compromise of ideals to suit the methods which are within the resources of physicians unfamiliar with obstetric procedures or without . . . the judgment essential to proper application of methods." He claims extreme conservatism in the first stage, but finds that "In a very considerable percentage of these cases the fetal head . . . still remains unengaged at the beginning of the second stage" and in all such cases is constrained to perform internal podalic version, utilizing this procedure in 63.4 per cent of his occipitoposterior positions. He not only advises operative interference after only one hour of second-stage labor, but says that personally he does "not wait at all for spontaneous rotation after the os has become fully dilated." Thus he accepts a forceps incidence of 34.4 per cent and scarcely over 2 per cent of his babies presenting initially in occipitoposterior positions escape extraction with forceps or by the feet. He shows the remarkably low fetal mortality of 1 per cent, but as this is in a series of what he calls "normal" pelvises, and as he admittedly allows no chance, even in normal pelvises, for spontaneous rotation to occur, he definitely places himself at variance with the majority of writers.

In contrast to the radicalism thus exemplified by Bill, and others far less cautious and dextrous than he, Burger says that when the head is in occipitoposterior position at or above the plane of the inlet the only correct attitude is careful observation and expectancy. Danforth insists that interference is not to be carried out until the head is well into the pelvis and moulding has occurred. Calkins, Litzenberg, and Plass review the matter of prolongation of labor by occipitoposterior

with the ovaries. In the three deaths there were no evidences of a previous pelvic infection. One patient was apparently infected from a suppurative leaking appendix (see Case 2). In one case a pyo-ovarium co-existed with a fibromyoma. Streptococcus positive. Died of pneumonia on the eighth day.

In a left pyo-ovarium the only tenable explanation was an infection via the hematogenous route from the tonsils or teeth. There was a positive streptococcus growth. Rupture occurred in its removal and death resulted from peritonitis in eight days (Case 1).

TABLE I. SUMMARY OF PYO-OVARIIUMS AND TUBO-OVARIAN ABSCESSSES

Group 1.—Memphis General Hospital, Nov. 1, 1932, to Jan. 1, 1935.

In 1,366 operated cases of pelvic infections, a suppurative ovary was found in eighty.

PYO-OVARIIUMS		TUBO-OVARIAN ABSCESSSES	
Right side	6	Right side	8
Left side	6	Left side	16
Bilateral	1	Bilateral	7
Unilateral	14	Unilateral	12
Not stated	6	Not stated	4
	<hr/> 33		<hr/> 47
Positive Wassermann	10	Positive Wassermann	10
Average sedimentation time	39 min.	Average sedimentation time	45 min.
Cultures positive	12	Cultures positive	8
Cultures negative	3	Cultures negative	19
Not stated	13	Not made	20
Average white count	8,879	Average white count	9,580
Fibromyomas	10	Fibromyomas	4

Summary of both groups: Occurrence: Pyo-ovariums, 2.05 per cent; tubo-ovarian abscesses, 3.04 per cent; combined groups, 5.09 per cent.

Positive Wassermann, combined groups, 25.03 per cent: Average sedimentation time—combined groups, fort-two minutes.

Deaths	{	3 tubo-ovarian abscesses	{	Shock	1st 24 hr.
				Peritonitis	9 da.
				Sepsis	17 da.
	{	3 pyo-ovariums	{	Peritonitis	9 da.
				Pneumonia	8 da.
				Peritonitis	3 da.

Average age, twenty-four years

Average illness, one and three-fourths years

Average preoperative days in hospital, 10.05

Average mortality, pyo-ovariums, 9 per cent; tubo-ovarian abscesses, 6.05 per cent

Average mortality, combined groups, 7.52 per cent

There were more positive cultures in the pyo-ovariums than in the tubo-ovarian group, the sedimentation time was quicker, and when compared with the blood count, it was out of harmony.

The three deaths occurring in 47 tubo-ovarian suppurations were due to the streptococcus. One of the three patients who had a large fibromyoma died of shock. Two died of streptococcus peritonitis.

The only available reference as to the location of ovarian suppurations is seventeen cases reported by Chomé in which he stated that "Sixteen were on the left side and one bilateral," which does not coin-

start analgesia. The fact that a patient *has pains which hurt her* is sufficient, regardless of dilatation."

There remains to discuss the nature of vaginal interference in the persistent cases in the second stage. I would not have you assume that all of the difficult cases must be so handled. If the scheme of careful prenatal estimation of prognosis which has been described is carried out, 6 to 8 per cent will appropriately be handled by elective cesarean section for bony dystocia, thus eliminating the least promising cases from the necessity of choice of vaginal delivery. About one-half of 1 per cent, in spite of such prenatal study will advance well into the second stage before their seriousness is appreciated, and may then require necessitous section, perhaps of the extraperitoneal type.

The others then offer a good prognosis to mother and child by some type of vaginal operative delivery. Because of the policy of extending conservative treatment well into the second stage, internal version is but rarely indicated and was used in my series in only 4 per cent. The vast majority of the remainder were delivered by one of two methods, i.e., manual rotation with forceps extraction or forceps rotation and extraction. It is not my intention to didactically indicate any one procedure of general choice. I believe that in any individual's hands, that procedure which by training and experience is most facile to him is best for his use. I have used both these methods extensively, but there has been evident an interesting change in choice of them. I first used the Kielland forceps ten years ago, but was not overwhelmed with enthusiasm for it and was rather reluctant to recognize its advantages. Its value has been more and more impressed on me with greater experience, and I have used it increasingly, as exhibited in Table I.

TABLE I

	MANUAL ROTATION FORCEPS EXTRACTION	FORCEPS (OTHER THAN KIELLAND) ROTATION AND EXTRACTION	KIELLAND FORCEPS ROTATION AND EXTRACTION
Prior to 1925	42.5%	27.4%	0%
1925-1929	24.1%	32.6%	15.6%
1930-1934	24.1%	24.1%	19.6%
15,000 public cases 1931-1935	5.0%	19.0%	28.0%

There has been a sharp drop in manual rotation in favor of total forceps rotation, and a progressive increase in the use of the Kielland forceps in preference to other types. I now believe that this instrument represents the best expedient for artificial rotation, and this opinion is evidently shared by my colleagues in charge of the public service, for in their hands manual rotation has dropped to a negligible use, while that of the Kielland constitutes a considerable majority of forceps procedures.

vessels in the tumor wall may preclude the removal of the entire sac. In such cases the leaving of part of the sac is successfully cared for by nature.

Acute pelvic infections should be treated conservatively, and not until such efforts are futile should surgery be resorted to.

CONCLUSIONS

In pyo-ovariums the streptococcus is responsible in 95 per cent of cases, while in the tubo-ovarian abscess the neisserian organism is primarily responsible. A tubo-ovarian abscess and pyo-ovarium should be differentiated from other pelvic inflammatory pathology; as the behavior and treatment are quite different. The mode of infection of pyo-ovarium is by contiguity of tissue, or through the circulatory system.

An attempt should be made to differentiate a pyo-ovarium from a tubo-ovarian abscess.

REFERENCES

- (1) *Anspach*: Gynecology 14: 415, 1934. (2) *Bell, W. Blair*: The Principles of Gynecology, ed. 3, Chap. 2, p. 308. (3) *Black, Wm. T.*: AM. J. OBST. & GYNEC. 14: 74, 1927. (4) *Idem*: J. Tenn. St. Med. Assn. Oct., 1927. (5) *Idem*: Conservative Treatment of Acute Pelvic Infections, South. M. J. 22: 49-55, 1929. (6) *Idem*: South. M. J. 26: 630, 1933. (7) *Blund, P. Brooks*: Gynecology, Medical and Surgical, 1925, Ch. xvii, p. 782-1135. (8) *Chomé, M. E.*: Abces non puerperaux de l'ovaire et abces du corps jaune. 80. Paris, 1919. Also: Arch. mén. d'obst. et de gynéc. 8: 113, 1919. (9) *Cordua, R., and Keck, E. A.*: Zentralbl. f. Gynäk. 1: 2747, 1926. (10) *Cosma, R.*: Ann. di ostet. 51: 753, 1929. (11) *Counseller, Virgil S.*: The Appendix and Large Intestine in Relation to Gynecology, Curtis Obstetrics and Gynecology 3: p. 707. (12) *Cuizza, T.*: Clin. obstet. 36: 348, 1934. (13) *Darnall, W. E.*: Med. Rec. 139: 395, 1934. (14) *Davis, C. H.*: Gynec. & Obst. 3: ch. 6, p. 19. (15) *Dejaunay, E.*: Paris chir. 6: 365, 1914. (16) *Dexeu Font, S., and Salarich Torrents, M. S.*: Arch. med., Barcelona 5: 385, 1929. (17) *Feldmann, I.*: Wien. klin. Wchnschr. 31: 1011, 1918. (18) *Forti, E.*: Ovarian Abscess Associated With Parovarian Cyst; Case, Arch. di ostet. e ginec. 20: 804, 1933. (19) *Frankelthal, L. E.*: Surg. Gynec. Obst. 26: 358, 1918. (20) *Fullerton, W. D.*: Surg. Gynec. Obst. 91: 180, 1913. (21) *Graves*: Gynecology, 1928, Part II, p. 225. (22) *Green-Armytage, V. B.*: Indian M. Gaz., Calcutta 62: 270, 1927. (23) *Haller*: Paris chir. 16: 352, 1924. (24) *Hibbett, C. W.*: Kentucky M. J. 23: 503, 1925. (25) *Kelly*: Gynecology, 1928, Chap. 27, p. 474. (26) *Marx, J.*: Beitr. z. klin. Chir. 159: 478, 1934. (27) *Miller, C. Jeff*: Clinical Gynecology, 1932, Chap. 111, p. 85. (28) *Ohman, K. H.*: Zentralbl. f. Gynäk. 37: 1033, 1913. (29) *Patel*: Lyon méd. 130: 963, 1921. (30) *Peham and Amreich*: Operative Gynecology 11: Chap. 6, p. 526. (31) *Peraire, M.*: Paris chir. 6: 449, 1914. (32) *Purslow*: Birmingh. Med. Rev. 71: 183, 1912. (33) *Ruiz, J. C.*: Semana med., Buenos Aires 24: 149, 1922. (34) *Schwarzkopf, E.*: Zentralbl. f. Gynäk. 36: 1303, 1924. (35) *Szamek, L.*: Wien. med. Wchnschr. 79: 1590, 1929. (36) *Tenani, O.*: Clin. Ostet. 21: 21, 1929. (37) *Walscheid*: Abdomino-Pelvic Diagnosis in Women, St. Louis, 1932, Chap. 10, The C. V. Mosby Co., p. 791. (38) *Wanner*: Zentralbl. f. Gynäk. 36: 1016, 1912. (39) *Wiener, S.*: Am. J. Obst. 78: 132, 1918.

OUT-PATIENT OBSTETRICS*

A REVIEW OF 6,863 CASES

HENRY BUXBAUM, M.D., F.A.C.S., CHICAGO, ILL.

(From the Service of the Chicago Maternity Center and the Department of Obstetrics and Gynecology of Northwestern University)

THIS report, which is a comprehensive review of all the work done at the Chicago Maternity Center since its inception on July 1, 1932 to June 30, 1934, is comparable somewhat to the type of obstetric practice found among general practitioners and obstetricians who do most of their confinements in the home. Therefore, statistics of this type, inasmuch as they approximate a cross-section of the obstetric practice in the United States, may be used as a standard of comparison for the general practitioner and the occasional obstetrician.

To be better able to appreciate this striking similarity and to evaluate the report properly, a brief description of our set-up with its numerous handicaps will be necessary. The Chicago Maternity Center was primarily organized as an endeavor to elevate the standard of obstetric teaching and practice while delivering indigent women in their own homes. It is readily apparent that we function in only the poorer districts of Chicago and the homes are usually of the worst type in which to do good aseptic obstetrics. Oftentimes our doctors are compelled to work without the aid of hot water, heat, or even light, and the sanitary conditions are indescribable. The medical personnel at the Center is comprised of three distinct but cooperating divisions: The internes, who are in absolute charge of their cases, are graduates of only Class A schools, and have completed at least one year's internship in some good general hospital. I wish to emphasize the fact that the interne is in complete charge of his case until superseded by a resident or attending obstetrician. Accompanying the interne on all cases is an undergraduate medical student from one of the universities in the Middle West with whom we are affiliated, and also by a nurse, either an undergraduate from an affiliate hospital or a postgraduate who is in the process of training for an obstetric career. The reason for emphasizing these salient facts is to show the type of work that can be turned out by young doctors under, seemingly, insurmountable obstacles, if they are properly supervised. No deliveries are done at the Center itself. This building is used as a central depot for registration of patients, as well as for ten prenatal, one venereal, one toxemic, one cardiac

*Read before the Chicago Gynecological Society, May 17, 1935.

In the present study the records from the Memphis General Hospital include age of mother, presentation, para, measurements of the outlet and inlet, length of the stages of labor, cephalic measurements of the child, injuries to the child, injuries to the mother, condition of the placenta, and operative treatment.

The records of the Chicago hospital give the age of the mother, weight of mother, external measurements of the pelvis, remarks on the pelvis, duration of labor, position and operative procedure, molding, child's death, para, and general remarks.

These data show that both white and negro women in the South have smaller pelves than in the North. This study, however, does not show a corresponding difference in the size of the infant head. The difference in pelvic measurements is in accordance with my personal observations.

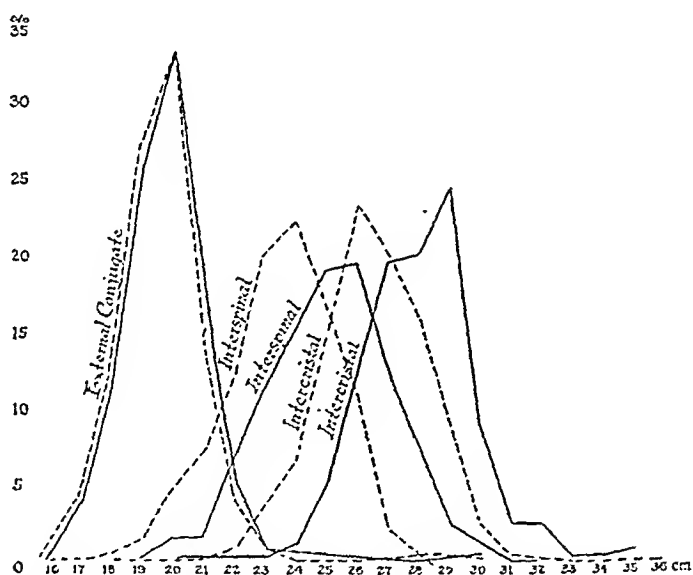


Fig. 1.—Cumulative frequency graph showing external measurements of white (solid lines) and negro (broken lines) women taken at the Cook County Hospital, Chicago.

The smaller size of the negro pelvis, in comparison with the white in the same locality, is shown in the data from both sections. The external conjugate in the negro, however, approximates the external conjugate in the white. For this reason the external conjugate alone cannot be taken as indicative of the comparative size of the pelvis. Although the weight of the negro child is appreciably less than that of the white child there is practically no difference in cephalic measurements. Thus while pelvic and cephalic measurements show a comparatively larger passenger through the passage in negro than in white cases, the conservative treatment at both the Memphis and Chicago hospitals shows clearly that pelvic measurements are not sufficient indication for cesarean section or other operative interference, and has resulted in a very high percentage of spontaneous births.

here that no interference is made in any case, even for teaching purposes, unless a definite valid indication exists. The indications for the use of forceps are tabulated in Table IV.

TABLE III. ANALYSIS OF FORCEPS OPERATIONS

TYPES	NUMBER	PERCENTAGE OF FORCEPS	MATERNAL MORTALITY	FETAL MORTALITY
High	6	3.2	0	0
Midplane	102	53.3	1	8
Low	83	43.5	0	2
Total	191	100.0	1	10

TABLE IV. INDICATIONS FOR FORCEPS

MATERNAL CAUSES	NUMBER	PER CENT	FETAL CAUSES	NUMBER	PER CENT
Uterine inertia	36	18.8	Persistent occiput pos- terior	74	38.5
Contracted pelvis	26	14.0			
Cardiac	7	3.6			
Abruptio placentae	1	0.5	Deep transverse arrest	37	19.5
Late toxemia	7	3.6	Prolapsed cord	3	1.5

There were 26 versions performed in this series, 25 in multiparas and one in a primipara for prolapsed cord (Table V). Versions are done in primiparas only when absolutely necessary. If the head remains high after an adequate test of labor in a primipara, we prefer to do a cesarean section, conditions permitting, and if the head is engaged in the pelvis a forceps extraction is, as a rule, the safer procedure.

TABLE V. INDICATIONS FOR VERSION

INDICATION	NUMBER	PERCENTAGE
Transverse presentation	11	42.0
Persistent high occiput posterior	2	8.0
Prolapsed cord	6	23.0
Asynclitism	2	8.0
Face presentation	5	19.0
Total	26	100.0

No mothers were lost in this series of versions, but nine babies succumbed, either during or soon after delivery, giving a mortality of 34.6 per cent. This figure is slightly higher than that obtained in smoothly functioning, well equipped maternities, but all of these versions were done in extremely poor homes under enormous handicaps.

All of the twelve craniotomies were done on dead babies, as it is deemed inadvisable to subject a mother to the risk of a difficult version or forceps operation when the fetus is already dead. There were no maternal fatalities in this group.

There were twenty-one cases of complete prolapse of the cord, or 0.3 per cent of the total number of cases. The method of procedure and the results obtained are shown in Table VI.

No mothers were lost, but six babies died, a fetal mortality rate of 29 per cent, approximately the same as cited in the larger maternities, and less than in most general hospitals. The method used in handling this complication, because of the ill chosen operating room, is somewhat different from that usually employed. As soon as the interne notes the cord lying in the vagina, he immediately cautions

only, rather than up and down as does the percentage frequency, it shows to better advantage the difference in the lengths between any two corresponding classes. Thus in the cumulative graphs of the negro and white at the Chicago hospital (Fig. 1) it will be seen that the difference in the external conjugate is only about 0.5 or 0.25 centimeter. On the other hand, the difference between the interspinals

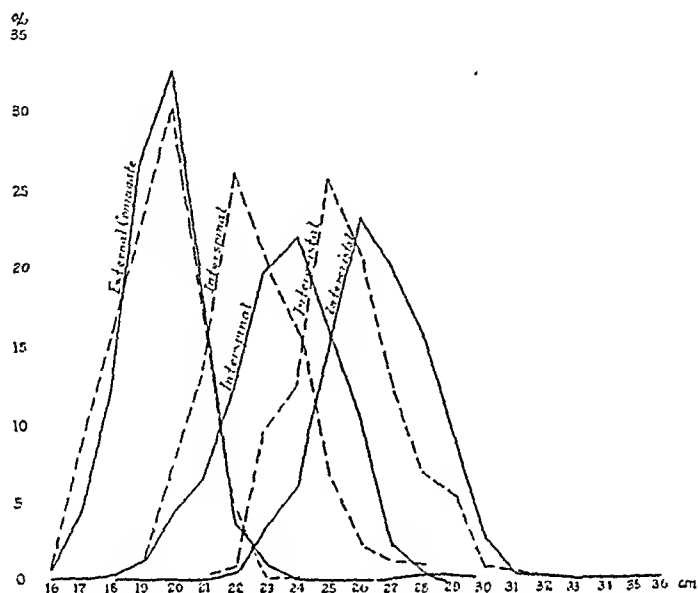


Fig. 4.—Cumulative frequency graph showing comparative external measurements in negro women from the Cook County Hospital (solid lines) and the Memphis Hospital (broken lines).

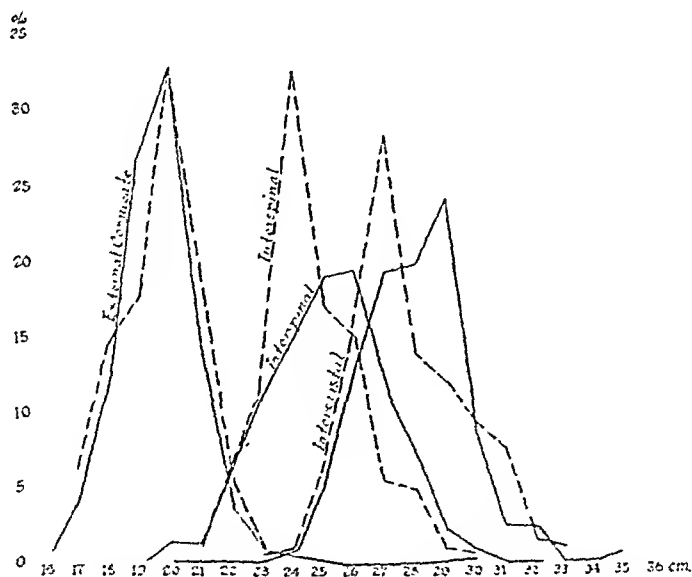


Fig. 5.—Same as Fig. 1 in white women.

diameter, for the greatest length of the graph, is about 2 cm. In the frequency graphs, because of the weight which any one percentage receives, it is impossible to estimate the variation so closely.

In the graph (Fig. 6), showing the weight of the child with reference to the diameters from the Memphis data, the weights for each length within a diameter were averaged numerically and then plotted.

the body of the uterus over the symphysis, thus compressing the uterine arteries. Where supportive treatment was indicated, normal saline solution was given under the skin, hypertonic glucose solution in the vein, and blood transfusion was done, if it was considered necessary. In sixteen cases it was found necessary to re-enter the uterus under the strictest of aseptic precautions and remove the placenta manually, and in thirty-six cases it was also found necessary to pack the uterus and vagina tightly with ten to twelve yards of plain sterile gauze. Thirteen of these latter patients were hospitalized soon afterward for treatment of secondary anemia. It may be of interest to mention that since this report was compiled we have instituted a blood transfusion unit for emergency transfusions in the home. The citrate method is used, typing and cross-matching the husband, relatives, or friends, trying to eliminate anyone with the least suggestion of a history of syphilis. This procedure, of course, is only used in desperate cases. Two mothers died in this series, giving a mortality of 0.8 per cent. These cases will be discussed with the other maternal deaths. It may also prove interesting to know that in addition to the sixteen manual removals of the placenta for hemorrhage, there were forty-two additional cases in which the placenta was removed manually because of failure to separate after several hours in the third stage with no bleeding. There were no fatalities or severe infections in any of these forty-two cases, again demonstrating the value of good asepsis.

Dührssen's Incisions.—This splitting of the effaced cervix at ten, two, and sometimes six o'clock was done as a preparatory operation twenty-five times. This is an incidence of 9 per cent of the operative cases and 0.3 per cent of the total number. All 25 patients were primiparas in whom the cervix was completely effaced, the paracervical tissues well retracted, and dilatation at 7 cm. or more. The average length of the first stage was forty-four hours, and the only indication was either severe maternal exhaustion or fetal distress. There was midforceps extraction in 21 cases, low forceps in 2, breech extraction in one and craniotomy in one. No mothers died and the fetal mortality was two. All incisions were immediately repaired with interrupted chromic catgut sutures where the patient was afebrile. Six weeks later, on postpartum examination, it was found that 20, or 80 per cent, of the incisions healed by primary intention, and 5, or 20 per cent, healed only fairly well with a slight eversion and gaping which responded well to the actual cautery treatment.

Episiotomy and Laceration.—Episiotomy was performed in 223, or 3.3 per cent, of all cases. This was not carried out as a routine but only in those primiparas in whom a laceration seemed imminent and in those multiparas who had had a previous episiotomy or a vaginal plastic with an abundance of scar tissue. It was done routinely on all primiparas in whom the delivery was completed by operative measures or when the fetal heart tones became irregular with the head on the perineum. There were 191 perineal lacerations, or an incidence of 2.7 per cent; 190 of these were second degree tears and one was a third degree. All episiotomies and lacerations were immediately repaired with interrupted chromic catgut in the mucosa and figure-of-eight silkworm sutures through the muscle, fascia, and skin in the perineum. The results obtained were considered satisfactory.

Breech Presentation.—There were 181 cases of breech presentation, 31 occurring in the primiparas and 150 in multiparas. The deliveries were completed as shown in Table VIII.

It was found from experience that in home deliveries particularly it is far more preferable, from both the standpoint of the mother and child, to allow the patient, whenever it is humanely possible, to expel all or at least a greater part of the baby spontaneously. By this method there is less likelihood of complica-

An average difference was noted of approximately 0.25 cm. in biparietal and in occipitofrontal. (Riggs has similar findings in his data.) Thus a head practically the same size as the white has to go through a birth canal appreciably smaller than that of the white. I have also found that the head of the negro child is harder to mold than is that of the white child, and this condition contributes to the more severe labors among the negro women. Statements can be found, however, in the literature to the effect that the negro child is smaller, which is true of comparisons based on weight and length (Riggs); it is also said that the head is easier to mold, these statements being made to account for the apparently high percentage of spontaneous births in the negro.

While the graphs of the negro and the white pelves are interesting, they have merely confirmed already established fact that the diameters in the negress are smaller than in the white. When the northern and the southern negro, represented by the Chicago negro and the Memphis negro, are compared, it is seen that there is a difference here which is almost as great as is the difference between the white and the negro. In other words, the northern negro is larger in diameters than is the southern negro; this is also true of the northern white and the southern white. While the point may be raised that there is a possibility of error due to the fact that the measurements were taken by different organizations, my observation has been that this is true. The difference in the pelvic measurements in the northern and the southern cases will be referred to later when considering the indications for cesarean section.

OPERATIVE TREATMENT

Out of the 445 cases under my care no cesarean sections were performed. Many cases came within the limits of elective cesarean section and even, according to some, of absolute indication.

Vaughan has said that in one of the New Orleans hospitals one thousand babies were delivered and forceps were used only four times. No cesarean sections were performed in this series. It would appear that indications for interference with Nature's management of labor are not as numerous as the majority of surgeons have stated.

Among the Chicago cases there were only 9 cesarean sections, and in these there were other indications aside from the pelvic measurements for the operation. Cesarean section should not be performed on the basis of pelvic measurements alone. It may require more skill and more time to deliver a woman per vaginam but unless there are other indications than measurements alone, the patient should be given trial of labor at least. It would seem that a different standard of absolute indication for cesarean section should be recognized in the South than in the North.

There is also a low frequency of other operative interference, there being 5.4 per cent low forceps among the Memphis white and 2.45 per cent among the Memphis black. Version and extraction was performed in

possible tears. Therefore, in this case the rupture was instantly recognized and the patient rushed to the hospital where blood transfusion and supravaginal hysterectomy were done with recovery. The last case was a spontaneous delivery followed by a severe postpartum hemorrhage which was controlled by pituitrin, gynergen, and uterine packing. The diagnosis of an incomplete rupture was considered questionable because the uterus was obtained after the patient's death, and it had been perforated by an undertaker's trocar. All three babies in these cases died. An instructive point brought out here is that the two cases in which a complete rupture was diagnosed on uterine exploration, both recovered after blood transfusions and supravaginal hysterectomy, but the case in which a laparotomy was not done died, which, of course, testifies to the value of an early diagnosis immediately followed by hysterectomy coincidental with blood transfusion in this obstetric accident.

Fetal Mortality.—The fetal mortality was computed on all babies weighing 1,500 gm. or over, stillborn or dying during the first two weeks of life. In our home service 186 babies died, an uncorrected gross fetal mortality of 2.84 per cent. Of this number 149, or 79 per cent, were mature infants and 37, or 21 per cent, were premature but viable. The corrected fetal mortality was 104 deaths or 1.60 per cent. Unfortunately only 40 per cent of these deaths came to autopsy, and, therefore, it is impossible to determine accurately the cause of death in all cases. The approximate causes of fetal death were asphyxia neonatorum, cerebral hemorrhage, prolapsed cord, fetal atelectasis, prematurity, melena, pneumonia, syphilis, abruptio placentae, drug addiction, and suffocation.

The method of delivery employed in these 104 cases is shown in Table IX.

TABLE IX. METHODS OF DELIVERY IN CASES WHERE BABY DIED

DELIVERY	NUMBER	PERCENTAGE
Forceps extraction	10	9.6
Version and extraction	9	8.6
Breech presentation	12	11.6
Breech extraction	2	1.9
Craniotomy	12	11.6
Spontaneous	59	56.7
Total	104	100.0

Maternal Mortality.—The reason for not including a study of our morbidity in this series is because our statistics in this regard are valueless. The patients are all confined at home and are usually visited once a day by either an interne, student, or nurse. The temperature readings are recorded only once a day and that at different times. In cases of frank sepsis, of course, the patient is seen more often.

Our maternal mortality is computed not only on those patients who died in the home, but also on all patients seen by us and then hospitalized, who died immediately or within several weeks after delivery. In this way only can any out-patient obstetric clinic report its statistics and analyze the outcome of all the cases, both pathologic as well as normal.

We had twelve maternal deaths, or one in 586 live births, an incidence of 0.17 per cent. Of these fatal cases 3, or 25 per cent, died in their own home and 9, or 75 per cent, died in a hospital. A very brief summary of each of these case histories follows.

CASE 1.—Mrs. D. L., colored, twenty-eight years of age, gravida iv; three full-term normal deliveries. Labor lasted four hours and was spontaneous. The third stage lasted fifteen minutes, and the placenta was delivered by simple expression, immediately followed by severe postpartum hemorrhage, estimated blood loss

THE EFFECT OF EXCESSIVE CIGARET SMOKING ON MATERNAL HEALTH*

ALEXANDER MACKENZIE CAMPBELL, M.D., GRAND RAPIDS, MICH.

PHYSICIANS who are vitally interested in maternal health look forward to an obstetric millennium in which women will be able to produce perfectly normal children at proper intervals and under such other favorable conditions as will result even in an amelioration of their physical and mental condition.

The obvious and more serious questions, such as lack of prenatal care, meddlesome midwifery, sepsis, abortion, and sterility, are already arresting the attention of leaders of the obstetric art, and the recent surveys in larger metropolitan centers indicate the great necessity for an intensive continuation of the study of the causes of the high maternal mortality and morbidity which exist in this country at the present time.

Without in any way minimizing the importance of meeting the larger problems which face those of us whose labors embrace the field of obstetrics, I desire to call attention to a more subtle and sinister condition which exists among American women today, and that is the excessive smoking and inhaling of cigars, which during the last two decades has clutched the young women of this country in a manner resembling the invasion of an epidemic working in virgin soil.

My convictions concerning this subject have arisen from personal observations. I have noted the gradual increase in the incidence of smoking among my obstetric patients from a time about twenty-five years ago, when it was practically negligible, to the present day, when it approximates about 50 per cent. I became convinced a few years ago from clinical observation that excessive smoking in certain maternity cases was detrimental to the patients' health, that their nervous systems were rendered unstable, that their digestive functions were impaired, that their respiratory and circulatory systems were definitely affected, and that, in a general way, these patients did not undergo the ordeal of pregnancy, parturition, and lactation with the normality which is observed in other women who either abstained entirely or who indulged in smoking very moderately.

I further observed that a number of expectant mothers consumed from 25 to 40 cigars a day, and it occurred to me that surely the maternal organism, already overworked by the physiologic demands of pregnancy,

*Read at the Forty-Eighth Annual Meeting of the American Association of Obstetricians, Gynecologists, and Abdominal Surgeons held at Skytop, Pa., September 16 to 18, 1935.

CASE 6.—Miss L. P., white, aged nineteen years, gravida i, a prostitute. We were called on the case by a private physician after he had made a vaginal examination. Labor lasted nine hours and delivery was spontaneous without an episiotomy. Blood loss was estimated at 350 c.c. The fifth postpartum day her temperature rose to 101.4°, pulse 88, and she continued a septic course for fourteen days. The fundus at this time was two fingerbreadths above the symphysis; lochia foul but scant; abdomen moderately tender. At this time, contrary to orders, the patient got out of bed and took a vaginal douche. The patient when next seen appeared quite ill, and examination showed the chest normal, moderate distention of the abdomen with extreme tenderness, which was more marked in the pelvis. Diagnosis was made of bilateral salpingitis. The patient was sent to a hospital where she died three weeks later. At autopsy a gonorrheal peritonitis was found. The baby lived.

CASE 7.—Mrs. M. B., white, twenty-six years of age, gravida iii, had two spontaneous deliveries. Present labor lasted twelve hours and was normal, with no lacerations. Third stage was normal with a blood loss of about 100 c.c. Three days following delivery, her temperature rose to 102° and pulse to 100, and there were pain and tenderness in the lower abdomen but no rigidity. Lochia was moderate in amount and foul. The following day her temperature was 104° and pulse 140; examination revealed anxious facies, profuse sweating, herpes on side of nose; tongue moist, throat inflamed, chest negative, abdomen distended and exquisitely tender. The uterus was palpated 6 cm. above the symphysis and was very tender. Urinalysis was negative for pus cells. Diagnosis was made of generalized peritonitis. The patient was sent to a hospital. Three days later she developed an ileus for which an enterostomy was performed. Blood culture revealed a hemolytic streptococcus, and the patient died the following day. Autopsy findings confirmed the diagnosis of septicemia and generalized peritonitis. The baby lived.

CASE 8.—Mrs. M. F., colored, twenty-four years old, gravida iii, had two previous spontaneous deliveries. The date of her last period was unknown and her prenatal care had been inadequate. On Nov. 6, 1933, at her last visit to the clinic, her blood pressure was 118/76 and urine negative. She called the Center on December 26, but before our arrival had gone to a hospital. The husband stated that she had had four convulsions at home. Delivered spontaneously next day of a still-born fetus and died two hours later. Diagnosis: Eclampsia.

CASE 9.—Mrs. H. K., colored, thirty years old, gravida iv. Had one full-term, one premature delivery, and one spontaneous abortion. The first day of her last menstrual period was April 16, 1933. She delivered spontaneously on Jan. 7, 1934, after a sixteen-hour labor; blood loss was estimated at 100 c.c.; no lacerations. Before our arrival an internal examination had been done by an elderly midwife. Immediately following delivery the patient's temperature was 99.2° F., pulse 90. On January 10, she was quite ill and restless; temperature 105.4° and pulse 140. The uterus was firm, three fingerbreadths below the umbilicus; there was marked abdominal tenderness and foul lochia. The interne was surprised to see that her entire genitalia was completely covered with a thick paste of molasses and sugar which the patient said had been applied by the midwife. This was cleaned off and the usual treatment for sepsis instituted. On January 11 her temperature was 100° and pulse 88, but the following day she again appeared very ill and was sent to the hospital where she died sixteen days later. Autopsy diagnosis: Puerperal sepsis. The baby lived.

CASE 10.—Mrs. H. J., colored, twenty-nine years old, gravida iii, had two previous normal deliveries. The first day of her last period was Aug. 16, 1933. At the prenatal clinic on Jan. 16, 1934, her blood pressure was 170/120, urine negative,

dysfunction. He believes that the hyperthyroidism acts by disturbing the function of the abdominal organs, especially the uterus and ovaries, and that it often produces catarrh and inflammation of the vulva, vagina, and uterine mucosa. Sodano experimented with adult white rats by injecting them with a solution of nicotine (0.10 c.c. of a 1:1,000 solution). He observed stupor, violent cramps, dyspnea; and difficulty in maintaining an equilibrium occurred a few minutes after the injection.

At the beginning of the fourth month there was a marked emaciation and loss of hair on the backs of animals injected. His histologic report showed many corpora lutea in full evolution, but he also found a small number of follicles which were atresic. He described changes in the cornua as follows: "Unusual tumefaction of the mucosa with great hyperemia of the vessels which were full of blood. The glandular crypts were more numerous than in the normal condition; the chorion mucosa was more rich in cellular elements which had more abundant protoplasm and an epithelial aspect. The tunica muscularis is hypertrophied and its vessels dilated and filled with blood."

The female rats were injected for a period of six months, receiving seventy injections. At the beginning of the fifth month the animals began to lose weight rapidly and lost hair from their backs and faces; they lost their vivacity and their actions were sluggish. At the end of the fourth month they were coupled with a male adult and only one became pregnant. The rat delivered at term six live offspring which died during the lactation period. The mother herself died suddenly after the death of the offspring and the autopsy showed nothing noteworthy excepting a slight hyperemia of the genitalia and a state of involution. The three rats which were injected after six months showed hyperemia of the genitalia which, in some instances, was very marked. The follicles in the process of maturation were less numerous and the atresic follicles were greatly increased. In some preparations cystic follicles were found.

This author concludes that excessive smoking does not affect the generative tract of women who work in tobacco factories.

Sodano believes that the sterility which occurred in his animals was due to changes which occurred in the mucous membrane of the cornua rather than to disturbances of the ovaries. He further believes that in spite of the prolonged action of nicotine the ovarian follicles may evolve to complete maturation, rupture spontaneously, and thus set free healthy ova which, if undergoing fecundation, will develop normally. He believes that the disturbances of the female genitalia produced by the prolonged use of nicotine may be due to changes in the uterus and tubes. His theory is that nicotine poisoning acts perhaps in an indirect manner on the female genitalia.

Sodano concludes that in his animal experiments the newborn died in the first period of lactation, in spite of regularly sucking the maternal breast. He believes that:

1. Nicotine introduced into adult female rats in small subcutaneous doses does not determine sterility by a direct action of the ovaries.
2. An eventual sterility of the animal may be due to inflammatory catarrhal processes in the uterus and tubes, determined by prolonged administration of the poison.
3. One cannot exclude a certain harmful influence which nicotine has on the product of conception.

At my suggestion Dr. William K. German, pathologist at Blodgett Memorial Hospital, has been experimenting with two healthy adult female rabbits with a view of determining the effect of repeated injections

4. One hundred and four babies were lost, a fetal mortality of 1.6 per cent. The fetal mortality for forceps was 5.2 per cent; versions, 34.6 per cent; prolapsed cord, 29 per cent; rupture of the uterus, 100 per cent; breech presentation, 7.7 per cent; and cesarean section, 20 per cent.

5. Twelve mothers died, 3 in their own homes, a maternal mortality of 0.17 per cent.

CONCLUSIONS

Conservative, patient management of obstetric cases, especially when delivered in the home, is undoubtedly the prime factor in keeping down an already unnecessarily high fetal and maternal mortality.

While it is certainly desirable to get a live healthy child, we feel that one is never justified in doing this at any moderate risk to the mother.

The value of these statistics is an attempt to establish a possible standard for comparison in the evaluation of results obtained by the average general practitioner and the occasional obstetrician with a similar type of practice, although we realized that comparisons in obstetrics are odious and not accurate, due to differences in economic, racial and geographic conditions.

Good obstetrics can be done under seemingly unsurmountable obstacles with proper supervision.

We feel that universities should take more advantage of this form of obstetric education since the student can get a better insight into the intricacies of abdominal and rectal diagnosis, the mechanism of labor, and the rigid aseptic technic as it must of necessity be practiced in the home.

55 EAST WASHINGTON STREET

Crossen, Robert J.: A New Electrode for Conization of the Cervix, J. Missouri M. A. 32: 125, 1935.

A new electrode for conization of the cervix with a cutting current is presented. It permits the treatment of more extensive cases of chronic cervicitis than does the Hyams electrode. Its use in 80 cases in the hands of 16 different members of a gynecologic service of Washington University over a period of two years shows it to be safe and effective. It removes the entire junction of the squamous and columnar epithelium where carcinoma is most likely to start, thereby giving a better specimen for diagnosis of early carcinoma. Removal of this chronic infected tissue becomes an important factor in the prevention of cervical carcinoma. It is hoped that by combining conization with an anterior and posterior Sturmdorf suture, the cases with extensive eversion ordinarily requiring a Sturmdorf operation can be done with much greater facility. The cases thus handled are as yet insufficient in number to justify conclusions as to the value of this combined technic. The cutting current eliminates the bleeding which is a troublesome feature of the Sturmdorf operation.

J. THORNWELL WITHERSPOON.

Newell states that nicotine in excess makes women unusually nervous, destroys the appetite, and causes insomnia and failure to gain weight.

Gordon tells his patients to limit their cigarets to ten a day without inhalation.

Adair thinks it is inadvisable either during pregnancy or lactation.

Falls advised all his patients to limit themselves to five or six cigarets a day.

Leighton states that excessive smoking in women is "damned foolishness."

Kosmak believes that excessive smoking interferes with proper anesthesia, produces marked nervousness when the smoking is stopped, increases pulse rate, produces annoyance from pharyngeal catarrh, and possible interference with lactation, and that it is a "damned nuisance" in other ways.

Litzenberg advises a limit of six cigarets a day, or none at all.

Hendry believes that intemperance in the use of tobacco is harmful but that a moderate use has no effects on his obstetric patients.

Mathieu refers to such symptoms as bad mouth, tracheitis, cough, mild chronic bronchitis, but he has seen no effects on the offspring.

Phaneuf believes that excessive smoking is injurious to maternal health and that it varies with the constitution of the individual concerned.

Van der Veer states that in his experience a woman's nervous system goes to pieces during excessive cigaret smoking and this in turn affects the unborn child.

Bainbridge thinks that it is especially harmful to girls who have not attained their full growth.

De Lee believes that the continuous inhalation of carbon dioxide and carbon monoxide may have a harmful effect.

James E. Davis remarks that women are usually unable to control the habit and that carbon dioxide illness occurs in rooms where too many are smoking.

Danreuther has observed increased nervousness and tendency to gastro-intestinal disturbances.

Potter, on the contrary, states that the majority of his patients smoke but he cannot find that it affects them adversely.

An analysis of the replies from these seventy-five members of our Association strongly indicates that a cross-section opinion held by leading obstetricians of this country is unfavorable to smoking among expectant mothers, excepting in moderation.

The writer, who subscribes to this opinion, most strongly believes also that in many cases there is in women a strong susceptibility to nicotine, and that complete abstention is in many cases highly desirable and even necessary as one of the safeguards to maternal health.

Hofstätter, in his book entitled *Die Rauchende Frau*, has reported a number of rather unusual cases of susceptibility to nicotine, and I have observed women who are not excessive smokers in whom the nervous, digestive, respiratory, and circulatory systems have been noticeably affected. On the other hand, many women apparently smoke excessively without observable ill effects.

I believe that the indulgence of so many American women in the use of barbiturates and other sedatives for insomnia is frequently associated with excessive smoking.

UNIVERSITY OF WASHINGTON
SCHOOL OF NURSING
HARBORVIEW DIVISION.

SIDDALL: EXTRAUTERINE PREGNANCY

421

extrauterine pregnancy, with available endometrium, found among the 124 treated by operation at Harper Hospital from January, 1930, to March 31, 1935. Of these 24 cases, the endometrium was obtained by uterine curettage in 20, by hysterectomy in 2, and by decidual cast and discharged fragments in one each. Further, a statistical study and comparison was made with four other suitable series, namely, those of Sampson, Geist and Matus, Moritz and Douglas, and Börner. Unfortunately, the excellent paper of Novak and Darner lacks sufficiently detailed data for this statistical comparison. Scheffey, Morgan and Stimson and others likewise give little or no information which could be used here.

The invariability of uterine decidual development in association with extrauterine pregnancy has received almost unanimous sanction. When not found, the explanation has been advanced that it had degenerated or been cast off following death of the ovum. There is some evidence to indicate, however, that decidual changes may occur more slowly than in normal pregnancy (Kaufman). Indeed, Liepmann believed that in a few cases decidua did not develop. Furthermore, Moritz and Douglas reported six cases without decidua in which there was no history of bleeding or desquamation from the vaginal tract. Practically, though, it may be assumed that decidual changes occur in the uterus with any pregnancy, whatever its location.

It must be admitted that there is a remote chance of diagnostic error even when decidua is found without chorionic elements. The quotation from Graves given in the first paragraph states that the fetal tissue fragments in uterine abortion may disappear before the decidua. Anything resembling intact decidua must be very rare under such circumstances. Frank reported the expulsion of a decidual cast, intact except for the fundal part, which was followed in twenty-four hours by a small ovum. There were no villi in the cast, and curettage here might have resulted in an incorrect diagnosis. However, it is not clear to me that this was not actually an example of interstitial pregnancy with abortion into the uterine cavity. I have known microscopic sections from a therapeutic abortion to show only decidua, while others made later from the same material contained abundant chorionic villi. Though the possibility of error must be recognized, yet it is apparently so slight that the finding of decidua may be accepted as strong presumptive evidence of ectopic pregnancy (Williams, Novak and Darner, etc.).

In Table I are given the Harper Hospital cases showing the method by which each specimen of endometrium was secured; the number of days from the last normal menstrual period until the specimen was obtained; the number of days between the onset of abnormal vaginal bleeding and the curettage, hysterectomy, etc.; and the type or phase

4. Women during pregnancy and during the period of lactation should either abstain from smoking entirely or limit the number of cigarets to four or five a day.

5. The unfavorable effects of excessive cigaret smoking on maternal health are not sufficiently recognized and are of enough importance to demand a closer observation of clinical manifestations and a continuation of experimental work.

REFERENCES

- (1) *Hoffstätter, R.*: Die Rauchende Frau, pp. 190-196, 1924. (2) *Campbell, A. M.*: J. Michigan State Med. Soc., March, 1935. (3) *Ogata, Sukema*: J. Med. Research 40: 1917. (4) *Unbchan, Gerd*: Arch. f. Gynäk., p. 371, 1931. (5) *Nakasawa, Rakura*: Jap. J. Med. Sc. 55: Pharm. Trans. and Abst. Tokyo 7: No. 1, 1933. (6) *Sodano, A.*: Arch. di ostet. e clinic 41: 559, 1934.

26 SHELDON AVENUE

THE USE OF CORPUS LUTEUM IN THE TREATMENT OF DYSMENORRHEA*

RALPH E. CAMPBELL, M.D., F.A.C.S., AND FREDERICK L. HISAW, PH.D.,
MADISON, WIS.

(From the Departments of Obstetrics and Gynecology, and Zoology of the University of Wisconsin)

THE treatment of dysmenorrhea by glandular therapy has not been successful in the majority of instances; failure has been in part dependent upon the unsuccessful isolation chemically of hormones in pure product.

Recent advance in biologic research by Hisaw and Fevold, Corner, and others, has made the corpus luteum hormone available as a pure product for medical use. We wish to emphasize that many biologic products have been marketed in the past as corpus luteum, which have contained very little of this hormone, if any. These products up to now have had a wide usage and a uniformity of failure in the treatment of dysmenorrhea. This result needs no further explanation.

We have been using a product of a pure corpus luteum hormone designated as corporin, by Hisaw. This preparation has been produced in the laboratories of Hisaw, according to his methods of extraction; it has been biologically tested to show the lack of follicular stimulation in the vagina of animals, which indicates a pure chemical separation of the corpus luteum hormone.†

The rationale of the treatment of dysmenorrhea by corporin has been known for years from the physiologic standpoint. It has been shown

*Submitted to the Forty-Eighth Annual Meeting of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons as a thesis for membership at Skytop, Pa., September 16 to 18, 1935.

†This investigation has been supported by the Wisconsin Alumni Research Foundation.

be of questionable value in differentiating intrauterine from extrauterine pregnancy since all parts of a possible uterine pregnancy might also have been cast off with the compacta. In the other instances showing decidua the compact layer was intact, though frequently there were signs of cellular degeneration.

Our series has a definitely higher incidence of decidua than have the four others which were cited above. These reports are abstracted below and in Table II for comparison. It is noteworthy that Moritz and Douglas show a marked discrepancy for cases with absent or recently begun bleeding. Also, Geist and Matus are the only authors to show agreement with the Harper Hospital series in a rather high incidence of decidua with protracted hemorrhage.

TABLE II. FIVE SERIES OF EXTRAUTERINE PREGNANCIES SHOWING INCIDENCE OF DECIDUA ACCORDING TO ONSET OF BLEEDING BEFORE ENDOMETRIUM WAS OBTAINED

ONSET OF ABNORMAL BLEEDING BEFORE SPECIMEN SECURED	SERIES	CASES	DECIDUA	PERCENTAGE
None to one week	Sampson	2	2	100.0
	Geist and Matus	11	10	90.9
	Moritz and Douglas	12	2	16.7
	Börner*	11	10	90.9
	Harper Hospital	5	5	100.0
	Total	41	29	70.7
Eight days to two weeks	Sampson	3	1	33.3
	Geist and Matus	12	7	58.3
	Moritz and Douglas	11	2	18.2
	Börner*	4	1	25.0
	Harper Hospital	5	4	80.0
	Total	35	15	42.9
Fifteen days to three weeks	Sampson	1	0	0.0
	Geist and Matus	6	2	33.3
	Moritz and Douglas	6	1	16.7
	Börner	7	2	28.6
	Harper Hospital	2	1	50.0
	Total	22	6	27.3
Twenty-two days to four weeks	Sampson	8	2	25.0
	Geist and Matus	4	2	50.0
	Moritz and Douglas	12	1	8.3
	Börner*	4	1	25.0
	Harper Hospital	3	2	66.7
	Total	31	8	25.8
Twenty-nine days to twelve weeks	Sampson	11	0	0.0
	Geist and Matus	6	2	33.3
	Moritz and Douglas	12	2	16.7
	Börner*	4	0	0.0
	Harper Hospital	9	4	44.4
	Total	42	8	19.0
All Cases		171	66	38.6

*Corrected according to author's case histories.

This patient stated that as long as she could remember she had never been free of menstrual pain until the beginning of the corporin treatment. This patient is to receive subsequent treatment.

Mrs. L., aged twenty-one years, white female, artist. Severe dysmenorrhea since onset at thirteen years. Periods were regular, twenty-eight-day type, flow three days and moderate. Partial bed rest has always been necessary for the first forty-eight hours. First series of treatments were given a year ago with 5 injections of 8 rabbit units with only partial relief. Second series of 5 injections of 8 rabbit units gave marked but not complete relief. The third series of 5 injections of 6 rabbit units were given with almost complete relief but a decided increase in flow. Following this injection, the patient wintered in Arizona where she remained free from menstrual pain. She returned to Wisconsin during the early summer with a reappearance of her menstrual pain which was again relieved by corporin injections.

Mrs. T., aged twenty-two years, married, nurse. Severe dysmenorrhea since the onset at fourteen. Periods were regular, four to five days' duration, moderate amount, and severe pain during the first two days. First series of 5 injections of 5 rabbit units gave very little relief. Second series of 5 doses of 8 rabbit units gave, in the patient's opinion, only 50 per cent relief. The third series of 5 doses of 8 rabbit units produced little or no relief. A fourth series of 5 doses of 8 rabbit units gave considerable relief. A fifth series of 5 doses of 8 rabbit units once again produced only partial relief. The patient's estimation of the relief was no better than that obtained by drugs before she started on the corporin treatment. The writer cannot classify the results in this case as impressive.

Mrs. L., aged nineteen years, white female, maid. Menses always painful since the onset at thirteen years and severe enough for bed rest. Periods were regular, twenty-eight-day type, and four days of moderate flow. First series of 5 injections of 6 rabbit units gave excellent relief. Second series of 5 injections of 8 rabbit units gave almost complete relief. Third series of 5 injections of 8 rabbit units gave comparable results. This patient has been without injections for two months and has had very little discomfort with her last two periods, but some increase in flow has been noted. This case shows once again a temporary relief of symptoms following the use of corporin.

SUMMARY AND CONCLUSIONS

No assurance can be given to the patient as to the permanence of relief after the discontinuance of all corporin treatments. Our small series of eleven cases presents some hope as to temporary relief after discontinuance of treatment. Much larger series of cases must be studied over a longer period of time to make a proper evaluation.

The corporin dosage in this series is not conclusive. In many instances much smaller doses may have produced comparable results; and perhaps in other cases the dosage should have been larger. It was our intention to find a dose that would convince us that dysmenorrhea could be relieved by corporin. Since we are now certain that corporin can be of value in the treatment of dysmenorrhea, we plan to study the questions of dosage and vehicle.

The effect of corporin on the amount of menstrual flow cannot be determined at this time.

It is safe to conclude that corporin can be used in selected cases with excellent relief; and, corporin, like all other medical treatments, will have its absolute failures and its partial and complete successes.

and were all diagnosed before the clinical records were consulted, so that these had no influence on the examiner. Nor is there any reason to question the reliability of the majority of the histories as the women were, with one exception, private patients and therefore in general sufficiently intelligent and informed to give accurate accounts of their symptoms. The few indefinite or questionable records are indicated in Table I by plus and minus signs or question marks.

It is obvious that this series contains too few cases for definite conclusions, but the clinical information obtained in the 20 patients subjected to curettage was so striking as to suggest, at least, that the diagnostic value of the procedure has been understated. The histories of these 20 patients showed that the majority presented obscure signs and symptoms; yet in 12 there was decidua without chorionic elements, a finding carrying a high degree of diagnostic probability. And, in the remainder, the absence of fetal elements in the uterus could have helped to rule out the possibility of uterine abortion. There was no evidence in any case of harmful effect from the procedure. It was impracticable to trace, for comparison, instances of suspected extrauterine pregnancy in which curettage was done but in which some other condition was finally found.

SUMMARY

The development of decidual changes of the endometrium in association with extrauterine pregnancy is generally acknowledged. Textbooks, however, give equivocal information regarding the performance of diagnostic curettage in obscure cases, though it is conceded that definite presumptive evidence of extrauterine pregnancy is given by the presence of decidua alone, and without chorionic elements. This was the finding in sixteen out of twenty-four cases of ectopic pregnancy from Harper Hospital.

Decidua disappears some time subsequent to beginning ovular death, as manifested by vaginal bleeding and pain. Our series, however, and four others from the literature showed such a high incidence of decidua when abnormal bleeding had preceded by only a week, or less, that diagnostic curettage seems indicated for indefinite cases with hemorrhage of short duration. After more prolonged hemorrhage, decidua was reported infrequently in three of the series cited from the literature but was rather frequent in the fourth. It was seen in about one-half of our cases with protracted bleeding, and was actually or potentially of considerable value in differential diagnosis.

I wish to take this opportunity to express my thanks to Dr. P. F. Morse for permission to use the pathologic material from the Laboratory of Harper Hospital.

REFERENCES

- (1) Börner, R.: *Ztschr. f. Geburtsh. u. Gynäk.* 101: 763, 1931. (2) Frank, R. T.: *Am. J. Obst.* 65: 466, 1912. (3) Geist, S. H., and Matus, M. R.: *Am. J.*

RESULTS

In the small group of patients in which impairment of kidney function was detected it was found that the results of the concentration test and the blood urea clearance were in close agreement. The fifteen-minute dye excretion in this group usually indicated impairment of function, also.

Data from three representative cases of this group are presented in Table I.

TABLE I. RESULTS OF KIDNEY FUNCTION TESTS IN CASES WITH RENAL DAMAGE

PA-TIENT	DATE	EXPECTED DELIVERY DATE	BLOOD PRES-SURE M.M. HG	URINE		CON-CEN-TRAT-ING ABIL-ITY SP. GR.	UREA CLEAR-ANCE PER CENT	P.S.P	
				PRO-TEIN	SEDIMENT			15-MIN. PER CENT	2-HOUR PER CENT
E. H.	12/ 9/34	2/14/35	180/120	++++	Casts and renal epithel.	1.029	92	17	62
	12/19/34	Pregnancy interrupted	Same	++++	Same	1.024	57		
	1/ 2/35			++++	Casts and renal epithel.	1.023	34	21	59
	1/14/35			+++	Casts		44		
C. J.	1/30/35								
	3/23/35	4/30/35	172/122	++++	Casts, R.B.C. and renal epithel.	1.024	58	11	66
	4/ 1/35	Delivery	Same	++++	Same		52		
	4/ 9/35						55		
	4/12/35			++++	Casts	1.023	83		
B. E.	4/24/35				Few R.B.C.				
	6/ 7/34	12/15/34	190/96	+	Casts	1.024	60	26	68

In the group of cases of normal pregnancy, which comprised the majority of patients studied, whenever the concentration test showed normal renal function, the blood urea clearance likewise was normal or, in a few cases, indicated hyperfunction. The fifteen-minute phenolsulphone-phthalein excretion, however, was below normal in the majority of these patients (Table II).

During the first part of this study dye excretion was measured, using voided urine. It was thought that incomplete emptying of the bladder might account for the frequently observed low fifteen-minute phenolsulphonephthalein excretion. Accordingly, in a series of patients the test was performed twice on each individual, on successive days, in exactly the same manner, except that on one occasion the urine was voided, on the other it was obtained by catheter, care being taken to empty the bladder completely. The results of this study are shown in Table III. It is seen that in only one case when the fifteen-minute dye excretion was low using voided urine, was it normal when the specimen was obtained by catheter.

vious pregnancies. Here are listed such conditions as psychoses related to the pregnant state, pyelitis, hyperemesis gravidarum, toxemia of pregnancy, difficult or complicated delivery and frequent, spontaneous miscarriage.

Nursing mothers and women who have recently terminated a pregnancy, either by delivery or miscarriage, have been enrolled in a class where the health hazard consists in unwise overburdening of the patient.

In every other field of medicine, social and economic factors merit recognition. In no field should they be more properly evaluated than in the genesis and maintenance of the physical, mental, and moral health of the family. There have been admitted 690 patients for social reasons, 413 for economic reasons, 3 have been referred to their own physicians for some special indication, and 25 have been refused admission, usually because they were already pregnant when they applied for admission.

At least three-fourths of this group has been comprised of women between twenty and thirty-five years of age. The modal age period has consistently been between twenty-five and thirty years. Patients have been admitted as young as sixteen years and as old as fifty-one years.

From the very onset more than 50 per cent of the patients of the series under consideration have applied for family regulation advice within the first ten years after their marriage.

Ten per cent of the series have applied for advice and treatment and have been accepted before they have ever experienced pregnancy. Significant components of this group are the premarital cases and those seen shortly after marriage. The largest single class when the division is made according to number of known pregnancies, 623 patients or 16 per cent of the series, has applied after completing their second pregnancy. Table I represents the reproductive life of these 4,000 women, both as to the number of known pregnancies and the number of children born alive.

It has often been variously and vaguely understood that contraceptive measures, as they are known today, by virtue of their complexities and the conscious effort required to conduct them, are dysgenic, in that socially and economically handicapped and so-called inferior classes will not avail themselves of such information nor practice the technic even after it is prescribed. No judgment is made as to inferior or superior classes, but sociologic data as to race, education, occupation of the husband, financial status, and housing conditions of the patients have been recorded to demonstrate that groups commonly considered socially and economically handicapped are found in the clinic's clientele in at least as large proportions as they are found in the general population of Cleveland.

patients impairment of renal function is shown by the concentration test and by the blood urea clearance, but the two-hour dye excretion is normal.

Chapman and Halstead⁵ have demonstrated that a measure of the fifteen-minute excretion of this dye is a much more sensitive test of kidney function. It was for this reason that the fifteen-minute test was employed in this study. In the limited opportunity for study of kidney function early in pregnancy, this test agreed with the results of the concentration test and the blood urea clearance. However, during the last months of pregnancy it was entirely unreliable.

It has been shown that the low values for fifteen-minute phthalein excretion are not in most cases due to residual bladder urine. In practically every patient showing low fifteen-minute excretion, as much dye was excreted in two hours as in those patients with normal fractional output, indicating that the dye was delayed in reaching the bladder. It is likely that the added circulation of the fetus and the physiologic dilatation of the upper urinary tract which has been shown to exist in the majority of women in the latter part of pregnancy⁸ may account for this failure to recover the normal amount of injected dye in the fifteen-minute period.

CONCLUSIONS

1. The results of the performance of three representative kidney function tests on each individual in a series of cases of pregnancy are reported.
2. The Lashmet-Newburgh concentration test and the blood urea clearance were found to be satisfactory tests of renal function throughout the course of pregnancy. Results of these two tests were generally in close agreement.
3. The two-hour phenolsulphonephthalein test does not measure impairment of renal function until kidney damage is severe.
4. The fifteen-minute ("fractional") phenolsulphonephthalein test is unreliable as a measure of renal function during the last three months of pregnancy.

REFERENCES

- (1) Freyberg, R. H.: J. A. M. A. 105: 1575, 1935. (2) Lashmet, F. H., and Newburgh, L. H.: J. A. M. A. 99: 1396, 1932. (3) Lashmet, F. H., and Newburgh, L. H.: J. A. M. A. 100: 1328, 1933. (4) Van Slyke, D. D., and Cope, C. L.: Proc. Soc. Exper. Biol. & Med. 29: 1169, 1932. (5) Chapman, E. M., and Halstead, J. A.: Am. J. M. Sc. 186: 223, 1933. (6) Van Slyke, D. D., McIntosh, J. F., Moller, E., Hannon, R. K., and Johnston, C.: J. Clin. Investigation 8: 357, 1930. (7) Stander, H. J., Ashton, P., and Cadden, J. F.: AM. J. OBST. & GYNEC. 23: 461, 1932. (8) Baker, E. C., and Lewis, J. S.: J. A. M. A. 104: 812, 1935.

Whenever an oclusive pessary is the method prescribed, the proper size is determined; the patient is taught to insert the device, to check its proper and correct application, and to remove it at the first visit. She is sent home to perfect her skill in applying the pessary before

TABLE II. PREVIOUS CONTRACEPTIVE PRACTICE

METHOD	NUMBER OF PATIENTS
Douche	468
Withdrawal or pessary	6
Withdrawal	1,188
Condom	685
Suppository	94
Contraceptive jelly	22
Pessaries (all types)	54
Continence	16
Condom or pessary	33
Withdrawal or condom	757
Other practices (postcoital voiding, straining, etc.)	68
Unknown	37
None	572
Total	4,000

TABLE III. METHODS PRESCRIBED

METHOD	NUMBER OF PATIENTS
Diaphragm pessary and lactic acid jelly	3,514
Diaphragm pessary or condom (both with lactic acid jelly)	59
Mizpah pessary and lactic acid jelly	67
Matrisalus pessary and lactic acid jelly	3
Dumas pessary and lactic acid jelly	3
Condom and lactic acid jelly	97
Condom and suppository	125
Withdrawal and lactic acid jelly	7
Withdrawal and suppository	2
Lactic acid jelly	29
Suppository	18
Condom or withdrawal	1
None	75
Total	4,000

the instructions are completed as to the actual practice of the technique. The usual time for the second appointment is one week after the initial visit.

In evaluating the results obtained with the practice of the contraceptive methods advised, it seems opportune to describe briefly the treatment proffered and to analyze the series into its components according to yearly admissions with correlation of the number of cases considered active as of January, 1934.

Several types of oclusive pessaries have been prescribed for these patients. By far the most commonly employed type has been the round spring diaphragm pessary. The size of these pessaries, as expressed in the diameter of the device measured in millimeters, has varied greatly, from size 60 to size 95, but sizes 80 and 85 have been more frequently used. Many patients have been fitted with diaphragm

Only 2 patients were sufficiently restless to require special attention. Nine patients are recorded as slightly restless, by which we mean that the patient tossed about somewhat or squirmed during a pain, but as soon as the pain was over, she fell asleep again. In contrast to the patients to whom we gave sodium amytal alone or sodium amytal and scopolamine, we used no sideboards on the beds of these patients because we found that they were perfectly safe without them.

Practically all the patients in this series cooperated well in the second stage, bearing down when they were told. They did not squirm about on the table nor undo the sterile drapes as we frequently observed in our previous series.

Labor was not prolonged if the drugs were given when the patient was really in labor. The average duration of labor for the primiparas was seventeen hours; for the multiparas it was a little under eleven hours. Most of the patients slept from four to six hours following delivery.

Of the 91 patients, 50 delivered spontaneously, 24 by elective low forceps, while the remaining 17 were indicated operative vaginal deliveries of one type or another. The third stage was normal in 90 patients. One of the patients who was delivered by forceps had a postpartum hemorrhage of about 1,000 c.c., due to a prolonged and poorly given anesthetic. There was no maternal mortality.

Twenty babies were slightly apneic at birth, but not sufficient to require any treatment. Eight babies were sufficiently asphyxiated to require a moderate amount of resuscitation. In 5 of these 8 cases, the mothers had received the sodium amytal and morphine within two hours of delivery. It is a well-known fact that morphine alone, used late in the first stage, often causes fetal asphyxia. There were 3 stillbirths in this series. One was due to a cerebral hemorrhage, while two were monstrosities.

Table I shows how sodium amytal and morphine, in the dosage described, compares with the other drugs reported by us previously. Rest-

TABLE I. COMPARATIVE ANALGESIA

DRUG	NO. OF CASES	DRUG ACTION (HOURS)	ANALGESIA (GOOD AND FAIR) PER CENT	AMNESIA (GOOD AND FAIR) PER CENT	RESTLESSNESS PER CENT	ASPHYX. BABIES PER CENT	AVERAGE DURATION LABOR (HOURS)	POSTPARTUM HEMORRHAGE (PER CENT)
1. Sodium amytal	60	2-3	58.3	28.0	33.3	8.3	14.6	0.0
2. Sodium amytal and scopolamine	53	3-4	92.4	67.9	39.6	1.8	16.4	0.0
3. Sodium amytal and morphine	91	4-5	98.7	50.5	2.2	8.7	15.5	0.0
4. Gwathmey	50	2-4	74.0	8.0	8.0	20.4	20.4	0.0
5. Avertin	40	1-3	79.7	17.5	2.5	14.8	14.8	32.5

has usually not been advised until several hours after coitus. Lately, with increasing frequency, an immediate vinegar or acetic acid douche has been prescribed. The suppository has almost always been of the type described above. The jelly has almost always been the lactic acid jelly previously mentioned, although in a few cases, a jelly containing chinosol has been used.

TABLE IV

CORRELATION OF CASES ADMITTED AND CASES ACTIVE, JANUARY, 1934			
YEAR	NO. ADMITTED	NO. ACTIVE JAN., 1934	PERCENTAGE OF ACTIVE CASES
1928-1929	225	36	16%
1929-1930	285	65	23%
1930-1931	536	147	27%
1931-1932	1026	412	40%
1932-1933	1043	573	55%
1933-Jan., 1934	885	850	96%

There are 1,760 women using the method prescribed at the clinic, regularly and to the exclusion of all other methods; 1,504 have abandoned the method. Of this number, 151 have discontinued the advice and treatment as given at the clinic for natural causes, such as death of either husband or wife, sterilization of either partner, either surgical or climacteric, separation or divorce. There have been 1,353 who have deliberately discarded the technic advised. The reasons given by this group for abandoning the method are varied but some uniformity prevails. The commonest reason for discontinuing the method advised is the effort involved. The majority of this group may be considered as having resorted to coitus interruptus as being much less bother. Some of the patients have become dissatisfied because of discomfort or actual pain sustained with the use of some mechanical device. Usually the husband has incurred the discomfort and almost always when the complaint is against the diaphragm pessary it is due to faulty application by the wife and can be promptly and entirely relieved by further instructions. Sometimes too large a pessary has been prescribed. Occasionally there is some idiosyncrasy to constituents in the jelly used in conjunction with the pessary. These difficulties need only to be appreciated by the physician to be relieved. Discomfort to the woman herself in the matter of the occlusive pessary may be due to similar causes and is amenable to similar relief. In the presence of pelvic inflammatory disease a properly fitting diaphragm may be intolerable, and hence the method becomes unsuitable. When the difficulty is entirely subjective and no objective symptoms are to be discovered, its relief is not nearly so certain. A word or two to the patient before sending her away to commence the practical use of the method prescribed as to the possibility of other treatment in the event the method advised seems unsuitable or

THE EFFECTS OF RADIATION ON THE HUMAN OFFSPRING*

PRESENT-DAY VIEWS

JAMES R. MILLER, M.D., HARTFORD, CONN., JAMES A. CORSCADEN, M.D.,
AND JAMES A. HARRAR, M.D., NEW YORK, N. Y.

DURING the past year a questionnaire was sent to the members of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons with a request for case histories, the study of which would throw light upon the effects of radiation on human offspring. Answers to the questionnaire showed considerable interest but offered surprisingly little indication of any widespread understanding of the subject.†

In the nature of things, first-hand experience of any single gynecologist is likely to be limited. The following review was therefore undertaken in order more clearly to present our present-day knowledge and to indicate aspects of the subject in which more widespread interest is desirable.

Reviews of the literature may be found in the writings of Flaskamp, Faerber, Murphy and Goldstein, and the present review attempts to present in its bibliography those significant articles which will enable the student quickly to orient himself on the subject.

Each year abstracts appear in the yearbooks of *Radiology*, *Gynecology and Pediatrics*, making available considerable information which is not easily accessible to most physicians.

The subject may be considered in two main divisions: (1) The effect on the immediate offspring or subsequent children of the person irradiated. (2) The effect, if any, on the future descendants of the irradiated person of the second and subsequent generations.

So far as we know the effect of radiation on the genes has never been proved for human beings. The evidence from animal experimentation is suggestive but not yet definite.

The effect of radiation on the immediate human offspring may be considered under two headings: (1) The effect of radiation given (a) early or (b) late during pregnancy. (2) The effect of radiation on offspring conceived subsequent to radiation therapy. In this latter group, Wintz distinguishes "early" from "late" conceptions. By "early" is meant conception in the first few months after application

*Presented at the Forty-Eighth Annual Meeting of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons, Skytop, Pa., Sept. 16 to 18, 1935.

†The article here published is in abstract, the complete report, with cases, may be found in the current volume of the Association's Transactions.

There have developed 231 pregnancies because the patients have discontinued the method prescribed. Many times the lapse of the prescribed technic has been very brief, as when the patient has been out of supplies, but conception has occurred very promptly with the interruption of the contraceptive program. Fifty-nine women have failed because they have erred in the technic of conducting the prescribed method, as in failing to cover the cervix with the occlusive pessary, neglecting to use spermicidal jelly, removing the pessary too soon, or failing to douche as directed. Three instances of faulty technic with condoms are included in this group. Those pregnancies occurring from failures in technic do not belong among failures of the method, for the errors in technic are avoidable.

Forty-one instances of pregnancy are recorded as failures of the method prescribed. In this group are considered all inexplicable pregnancies. In some of these forty-one cases the history has been inadequate to assign any cause for the pregnancy, and they have been included as failures of the method rather than jeopardize the integrity of other groupings. Some of these failures might be avoided in the future with increased skill in the matter of determining the most suitable contraceptive treatment for various indications.

TABLE VI. CLASSIFICATION OF PREGNANCIES AS RELATED TO CONTRACEPTIVE TREATMENT

REASON FOR PREGNANCY	NUMBER OF CASES
Planned	26
Pregnant before commencing technic	112
Discontinued Mizpah pessary	2
Discontinued diaphragm pessary	211
Discontinued pessary or condom	2
Faulty technic with pessary	56
Faulty technic with condom	3
Discontinued condom	11
Discontinued spermicidal jelly	3
Discontinued suppository	1
Discontinued withdrawal or suppository	1
Method failed	41
Total	469

The value and necessity of routine check-up after the patient has been using the method three months is made a matter of concern to patient, doctor, nurse, and referring agent wherever possible. The follow-up of the nursing staff is intensive to the end that this return shall be effected. At the three months' routine reexamination, many difficulties may come to light. Such are usually easily removed at this time, before the patient sustains failure, prejudice, or indifference. Sometimes the method needs to be supplanted, sometimes the size of the pessary needs to be altered, particularly if the fitting has been done premaritally or early in the postpartum career, and sometimes the technic needs to be corrected. Patients are seen routinely

Considerable experience in the use of x-radiation for the production of therapeutic abortion has been reported by Mayer, Harris and others. Sixty per cent S. E. D. delivered to the center of the pregnant uterus in the early months will invariably destroy the fetus with no demonstrable effect on the placenta.

A personal communication from Harris and Mayer shows an experience of 200 cases. The last 150 when subjected to their technic were followed by complete spontaneous abortions in an average of two and one-half weeks. None of these cases showed subsequent amenorrhea. One patient was aborted by this method twice and another three times.

Many instances have been reported by Murphy, Goldstein and others, showing microcephaly and other serious developmental defects of the central nervous system following therapeutic x-radiation during pregnancy. On this point there is general agreement that such a high proportion of serious defects may be expected that great care should be taken to obviate irradiating a pregnant woman, or if such treatment be given by mistake, pregnancy should be interrupted.

Daniel feels that doses up to 20 per cent S. E. D. may possibly be given without fetal change. Doses from somewhere between 15 and 35 per cent S. E. D. will allow pregnancy to progress normally but with more or less serious damage to the fetus. Since the ovarian castration dose is usually calculated at about 35 per cent S. E. D., the danger becomes apparent. It is generally stated that from a given dose there is greater effect in early than in late pregnancy.

Mazer and Spitz report twenty-six healthy children born to women who had received x-radiation to the pituitary and ovaries for the treatment of scanty or absent menstruation. Radiation was described as 127 k. v., 5 m. a., 14-inch distance, 5 mm. aluminum filter for three to five minutes, calculated 7.5 to 12.5 per cent S. E. D. or 50-80 r. (Exact dosage to ovaries not stated nor length of follow-up for the children.)

Wintz is opposed to the use of x-radiation for the purpose of producing therapeutic abortion except in very carefully selected cases in which the patients are too sick for operative abortion. He warns that a dose less than 60 per cent S. E. D. might be given inadvertently, allowing pregnancy to proceed.

Faerber quotes results of animal experimentation which seem to show that the same quantity of radiation applied to different animals under otherwise comparable circumstances does not always bring about the same degree of damage, and he recalls that even after considerable radiation treatment normal children have been born.* It is therefore suggested by him that there may be other individual factors of susceptibility of which we know nothing. However, we must remember that there is considerable variation in the quantity of radiation delivered under various technics, and also with the same technic unless the apparatus is constantly under standardization.

It would seem more difficult to estimate the effects of radiation given by radium, for we must consider not only the variations of technic but also many other factors which are not so easy of estimation, such as the quantity of amniotic fluid, the location of the placenta, and the position of the fetus in utero, all of which would cause great variations in the radiation effects.

In 1931 resolutions were passed by the two National Societies of Germany concerned with Heredity and Racial Hygiene, as follows:

- “1. All persons in whom there is a suspicion of radiation damage to the ovaries should have no children.

*e.g. Lacomme reports x-radiation, 5 treatments, one and one-half hours each for fibroid in a thirty-nine-year-old para iv at fourth month of pregnancy. Normal child and two subsequent babies born. Radrated child normal at age three.

Another patient, age thirty-seven, para iv, had 3 treatments of 400 r. each in second and third month. Normal child delivered at term. Had only rickets due to poor nutrition in second year of life.

STATISTICAL STUDIES ON PUERPERAL INFECTION

I. SOME FACTORS INFLUENCING THE INCIDENCE OF PUERPERAL INFECTION

C. H. PECKHAM, M.D., BALTIMORE, MD.

(From the Department of Obstetrics, Johns Hopkins University and Hospital)

THE problem of puerperal infection is still far from its ultimate solution, as evidenced by the fact that its fatalities still rank first in maternal mortality statistics. Undoubtedly, in the light of present knowledge, the majority of these deaths are preventable, as demonstrated by a number of reports which have recently appeared from various clinics presenting a very low incidence of puerperal infection and a minimum of deaths due to it. Unfortunately, any attempt to compare these figures with those of other clinics is impossible since no universal standard is employed as the criterion of a morbid case. Furthermore, temperature readings are often not recorded routinely after the third day of the puerperium in cases which have hitherto been afebrile. The greatest discrepancy, however, lies in variations of clinic clientele, since it is obviously inexact to compare morbidity incidence in a private hospital with one in which the patients are chiefly of the ward group, or an institution accepting only "booked" cases with one having a large emergency service. Also, the incidence of infection will be lower in a hospital accepting all patients requesting admission than in a small teaching clinic limited to those women presenting definite obstetric abnormalities.

It is the latter type of institution, however, which is in the best position to study the effect of these complications upon the incidence of puerperal infection. The Department of Obstetrics of the Johns Hopkins Hospital accepts approximately 1,500 admissions a year and among them abnormal cases make up a high percentage. It is important to note that only about 7 per cent of the delivered patients are private, the remainder being about equally divided between white and colored women of the lowest social status, over three-quarters of them being unable to contribute anything to defray hospital expenses. Normal multiparas are not admitted and many normal primiparas have to be refused due to lack of beds. Moreover, at least 10 per cent of the total admissions constitute emergency and often neglected cases. Fifteen per cent of the white and 45 per cent of the colored patients have some degree of pelvic contraction and 12 per cent suffer from a toxemia of pregnancy. These facts demonstrate that the clinic clientele is comprised chiefly of women whose physical, mental, and social status render them unsatisfactory obstetric subjects. They do, however, make up a series of cases affording an

1923. *Daniel, C.*: Bull. et mém. Soc. de radiol. méd. de Paris 20: 91, 1932. *Faerber, E.*: Jahrb. f. Kinderh. 89: 33, 1933. *Flaskamp, W.*: Strahlentherapie 24: 282, 1926; Zentralbl. f. Gynäk. 51: 14, 1927. *Flaskamp, W., and Wintz*: Fortschr. a. d. Geb. d. Röntgenstrahlen 35: 42, 1926. *Goldstein, L.*: Arch. Neurol. & Psychiat. 24: 102, 1930. *Goldstein, L., and Murphy, D. P.*: Surg. Gynec. Obst. 49: 804, 1929. *Goldstein, L., and Murphy, D. P.*: AM. J. OBST. & GYNEC. 18: 189, 1929. *Goldstein, L., and Murphy, D. P.*: AM. J. OBST. & GYNEC. 18: 696, 1929. *Harris, William*: Am. J. Roentengenol. 27: 415, 1934. *Hertwig, O.*: Arch. f. Mikrobiol. 77: 1, 1911. *Hertwig, G.*: Arch. f. Mikrobiol. 77: 165, 1911. *Hertwig, P.*: Arch. f. Mikrobiol. 77: 301, 1911. *Karger, P.*: Jahrb. f. Kinderh. 87: 367, 1932. *Lacomme*: Bull. Soc. d'obst. et de gynéc. 20: 457, 1931; abst. Am. J. Dis. Child. 44: 196, 1932. *Luxenburger, H.*: Strahlentherapie. 45: 679, 1932. *Luxenburger, H.*: Fortschr. d. Neurol. Psychiat. 5: 1, 1933. *Martius, H.*: Strahlentherapie 41: 47, 1931. *Mawer, E.*: Strahlentherapie 45: 691, 1932. *Mazer and Spitz*: AM. J. OBST. & GYNEC. 30: 214, 1935. *Murphy, D. P., and Goldstein, L.*: Am. J. Roentgenol. 22: 207 and 322, 1929. *Murphy, D. P., and Goldstein, L.*: Surg. Gynec. Obst. 50: 79, 1930. *Naujoks, H.*: Strahlentherapie 32: 613, 1929. *Nielsen, M.*: Acta obst. et gynec. Scandinav. 13: 235, 1933. *Nürnberg, L.*: Strahlentherapie 45: 700, 1932. *Nürnberg, L.*: Strahlentherapie 24: 125, 1926; abst. Zentralbl. f. Gynäk. 51: 1, 1927. *Stefanik, S.*: Bratisl. lékař. listy. 13: 53, 1933; abst. Yearbook of Obstetrics and Gynecology, Chicago, 1933, p. 376. *Wintz*: München. med. Wehnschr. 80: 172, 1933; Digested: The Yearbook of Obstetrics and Gynecology, Chicago, 1933, p. 42. *Wyser, D. D., and Mayer, M. D.*: AM. J. OBST. & GYNEC. 14: 62, 1927. *Timofeef-Ressovsky, N. W.*: J. Heredity 22: 221, 1931. *Muller, H. J.*: Science 66: 84, 1927. *Idem*: Proceedings of the National Academy of Sciences, U. S. A. Volume 14. *Idem*: Radiation Genetics. IV. International Radiologenkongress. H. R. V. *Bagg, H. J.*: Am. J. Roentgenol. 16: 529, 1926. *Nürnberg, L.*: Klin. Wehnschr. 9: 2233, 1930. *Little, C. C., and Bagg, H. J.*: J. Exper. Zool. 41: 45, 1924. *Bonnevie, K.*: J. Exper. Zool. 67: 443, 1934. *Hanson, F. B., and Hayes, F.*: Am. Naturalist 63: 201, 1929.

PREGNANCY FOLLOWING RADICAL RESECTION OF THE RECTUM FOR CARCINOMA

W. T. POMMERENKE, M.D., ROCHESTER, N. Y.

(From the Department of Obstetrics and Gynecology, Strong Memorial Hospital, The University of Rochester School of Medicine and Dentistry)

ALTHOUGH the subject of carcinoma of the rectum is represented by an extensive literature, the association of pregnancy with this disease has received comparatively little attention. That this is true is not surprising when one considers that the age incidence of carcinoma of the rectum lies, for the most part, beyond the period of reproduction, as is shown by the compilations of Karsner and Clark.¹ Extensive surgery had for years mutilated the generative organs thus forestalling the possibility of future pregnancies. Even now, while the uterus and its appendages are usually preserved during the radical operation, it is still the vogue with many operators to utilize these organs to help form a new pelvic floor at the site of the resection. Even when this is not necessary, various procedures have been instituted from time to time to effect sterilization, because of the opinion, as voiced by Katz and Kaspar,² and Katz,³ that pregnancy at times apparently favors the recurrence of carcinoma of the rectum. This same net result, i.e., sterilization, has more recently been accomplished as a by-effect eventuating from the follow-up x-ray therapy.

To Lever,⁴ in 1843, is attributed the first description of a case of carcinoma of the rectum complicating pregnancy. From then until 1905 Nijhoff⁵ was able to assemble only 22 cases of this disease associated with pregnancy. Hochenegg⁶ in 1905 could cite 6 cases in which women who had had sacral resections for carcinoma of

in the black as in the white race. In a number of other statistical studies previously published by the author from this Clinic, it has been found that the black woman is in almost every way a poorer obstetric risk than the white. The maternal mortality rate is significantly higher in the colored race, and it is our experience that most of this discrepancy is in terms of deaths due to puerperal infection.

There is a definite correlation between the age of the patient and her risk of infection after delivery. This is not to be explained entirely in terms of a disproportionately large number of primiparas with a resultant high operative incidence in the younger age groups, since a similar decrease in infection with advancing age is observed if primiparas alone are considered. It will be seen that the incidence of infection in-

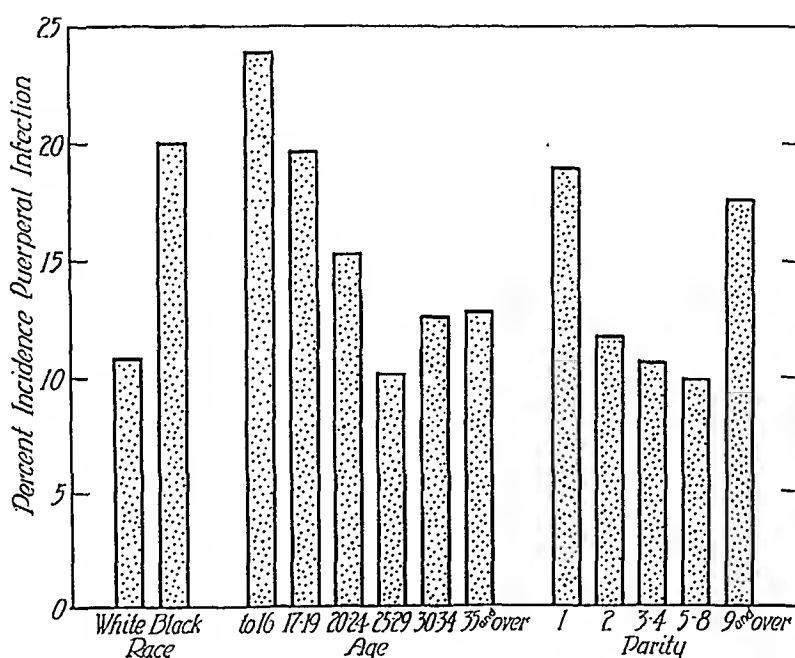


Fig. 1.—The incidence of puerperal infection as affected by race, age, and parity.

creases in women aged thirty and above and in the group para ix and over. Whether or not these findings portray an accurate picture is not clear, but they do coincide with our experience that the "grand" multipara is in many ways far from being an ideal obstetric risk.

It is felt by many that a deplorable tendency of modern obstetrics is the trend toward radicalism as evidenced by the high incidence of operative deliveries. That such a routine carries with it an increased hazard to the mother due to a high incidence of puerperal infection is illustrated in Table II and Fig. 2. It is interesting to note that even a perineal tear or episiotomy, although immediately followed by repair, increases the incidence of infection to a significant degree. Moreover, the operative group, although consisting chiefly of such simple procedures as

asphyxiated, and despite efforts at resuscitation died after a few minutes. The puerperium was uneventful and afebrile. Four return visits to the postnatal clinic were made during the three-month interval following delivery, and pelvic examinations showed the uterus to be involuting normally, although it lay fixed in second degree retroversion. Some slight thickening was present on the left adnexal region just below the colostomy opening.

On Jan. 16, 1935, the patient again returned to the prenatal clinic and at this time was five months pregnant. Prior to her pregnancy, her menstrual cycle had been normal and her general health excellent. Varicose veins on the left lower leg caused some discomfort but there was no edema. Her pregnancy progressed without incident and on April 22, 1935, after an easy six-hour labor she was spontaneously delivered of a normal female child of 2,700 gm. The perineum remained intact. Examination of the patient at the time of this last admission to the hospital showed her to be in good physical condition. Vital signs were essentially normal. No masses other than the involuting uterus were palpable in the abdomen or pelvis when she was discharged. At this time she weighed 126 pounds. Laboratory findings: R.B.C., 3,850,000; W.B.C., 11,000; Hb., 12 gm. per 100 c.c. Urine negative for sugar and albumin. Stools guaiac negative. At the time of her last return visit to the postnatal clinic, three weeks after her delivery, the uterus was well involuted, but lay fixed in a retroverted position. A moderate-sized cystocele was present. The liver margin was not palpable. Aside from the uterus, no masses were discovered on abdominal or vaginal examination. The colostomy was functioning satisfactorily without recourse to cathartics. The patient had no complaint whatever, and presented a picture of good health.

Comment.—The case reported shows an excellent postoperative recovery following an abdominoperineal resection of the rectum for carcinoma. The colostomy is giving good service and there is no evidence of recurrence of the tumor, four years after the operation. The patient has since delivered two children. The comparative ease of the last labor is probably to be explained on the basis of decreased perineal resistance following removal of some of the perineal and levator ani fasciae and muscles at the time of operation. It would, therefore, appear that, in certain selected cases, the female generative organs may well be preserved intact, at the time of radical removal of the rectum for carcinoma, with impunity as far as the reproductive functions are concerned.

REFERENCES

- (1) Karsner, H. T., and Clark, B.: *Am. J. Cancer* 16: 933, 1932. (2) Katz, H., and Kaspar, F.: *Arch. f. Gynäk.* 128: 250, 1926. (3) Katz, H.: *Arch. f. Gynäk.* 143: 150, 1930. (4) Lever, J. C. W.: *Guy's Hospital Reports* 1: (Second Series), 26, 1843. (5) Nijhoff, G. C.: *Zentralbl. f. Gynäk.* 28: 881, 1905. (6) Hochenggg, Julius: *Lehrbuch der Chirurgie*, Wien u. Berlin, 1908, Urban and Schwarzenberg. (7) Tagliaferro, P.: *Riv. d'ostet. e ginec. prat.* 14: 242, 1932. (8) Mengert, W. F.: *Am. J. Obst. & Gynec.* 26: 451, 1933.

Epstein, Ervin, and Rosenblum, Harold: *Peripheral Neuritis and Abortion Following Dinitrophenol Therapy*, *J. Lab. & Clin. Med.* 20: 1118, 1935.

The authors report a case of peripheral neuritis and abortion occurring in a gravida iv while under therapy for reduction in weight with dinitrophenol. The toxicity of dinitrophenol is discussed with its causal relationship to neuritis and abortion.

W. B. SERBIN.

fection. Moreover, it may be stated that the incidence of prolonged labor (thirty hours or more) was over twice as high in the infected as in the normal group, and was 17.72 and 7.92 per cent, respectively.

It was rather expected that an increased incidence of puerperal infection would be found in patients who waited until late in labor before seeking admission to the hospital. Table IV shows that such was not the case, although infection occurred in over three-fifths of the women upon whom attempts at delivery had been made in the home prior to their admission. It seems probable that the time of admission has little effect upon the subsequent course, despite the figures shown in Table IV,

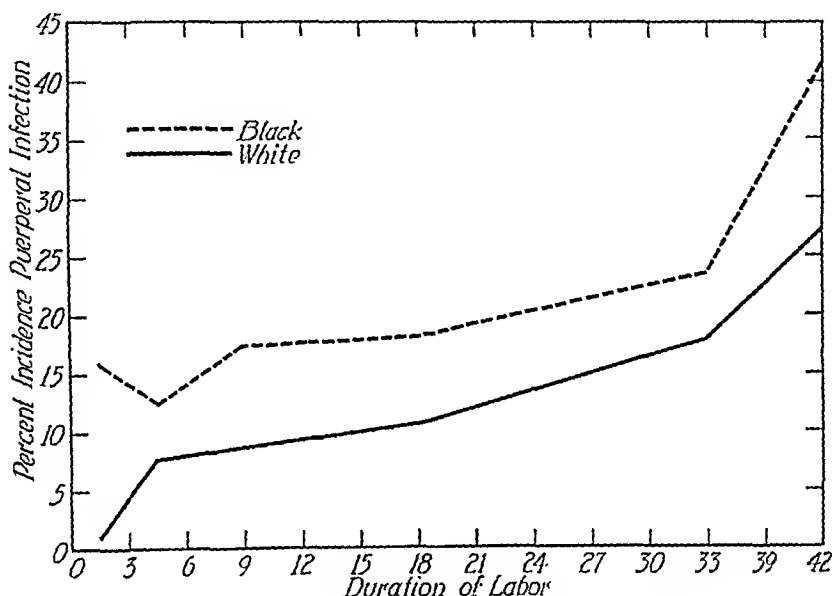


Fig. 3.—The incidence of puerperal infection as affected by the duration of labor.

since a great many of those patients admitted to the hospital prior to the onset of labor presented definite abnormalities; and the incidence of induction of labor and operative delivery was high in this group.

TABLE III. THE INCIDENCE OF PUERPERAL INFECTION AS AFFECTED BY THE DURATION OF LABOR*

HOURS DURATION	INCIDENCE PER CENT PUERPERAL INFECTION		
	WHITE	BLACK	TOTAL
0-2	1.19	16.00	9.24
3-5	7.50	12.40	9.88
6-11	8.74	17.23	13.12
12-23	10.50	18.15	14.93
24-41	18.15	23.34	21.32
42 and over	27.27	41.61	36.45
Mean Duration of Labor	PUERPERAL INFECTION		PUERPERIUM NORMAL
White	17 hr. 30 min.		13 hr. 43 min.
Black	18 hr. 4 min.		14 hr. 49 min.
Total	17 hr. 49 min.		14 hr. 17 min.

*Omitting cesarean section and unknown.

TABLE I*

	DATE	NAME	AGE	GRAVIDA	INDICATIONS	MORBIDITY	NUMBER OF HOSPITAL DAYS
1	1/19/31	R. P.	18	i	38 hr. labor, membranes rupt. 2 days. Just minor pelvis with disproportion	2 days	14
2	4/18/32	E. DeF.	33	i	24 hr. labor. Breech. Markedly edematous cervix. Many vaginal examinations	1 day	15
3	8/17/32	M. V.	21	i	Seen after attempted high forceps; very marked Bandl's ring	5 days	14
4	7/19/33	E. S.	29	i	Uterine inertia. Cervical dystocia, membranes ruptured 30 hr. R.O.P. barely engaged	4 days	14
5	2/27/34	C. DelG.	21	i	4 days labor, rigid cervix. Many vaginal examinations	None	14
6	3/31/34	M. S.	33	i	Voorhees' bag induction for postmaturity. 48 hr. ineffectual labor, floating head	1 day	16
7	6/ 3/34	B. C.	30	iii	Generally contracted pelvis. 2 stillbirths. 8 hr. labor. No engagement. Examined vaginally	None	13
8	6/30/34	P. C.	28	i	Generally contracted pelvis with disproportion. Rupt. membranes 24 hr. 12 hr. of labor	None	13
9	7/30/34	A. C.	24	i	Generally contracted pelvis with disproportion. 14 hr. ruptured membranes. 18 hr. labor. Vaginal examinations	None	14
10	11/ 3/34	I. L.	22	i	24 hr. of hard ineffectual labor. R.O.P. in brim. 24 hr. of rupt. membranes. Many vaginal examinations	2 days	14
11	11/26/34	M. M.	27	i	48 hr. of labor. Cervical dystocia. Midwife case. Many vaginal examinations	2 days	12
12	2/12/35	I. C.	20	i	24 hr. labor. Membranes rupt.? No engagement, R.O.P.	2 days	14

*With the exception of Cases 4, 6, and 12, these patients were all seen late in labor in consultation or were brought into the Ward Service at Grace Hospital. Cases 4, 6, and 12 were from my private practice.

is carried out in the first stage it is usually done in an attempt to speed up an already unsatisfactory or prolonged labor.

The influence of some medical and obstetric complications on the incidence of infection during the puerperium is shown in Table VI. Despite the general lowering of body resistance coincident to chronic cardiac disease no increase in the morbidity rate was observed in cases with this complication. A high rate of puerperal infection in patients whose pregnancy was complicated by pyelitis was to be expected, and the effect of syphilis on infection rates generally is well known. Whether there is a

TABLE V. THE INCIDENCE OF PUERPERAL INFECTION AS AFFECTED BY THE TIME OF RUPTURE OF THE MEMBRANES

TIME OF RUPTURE	INCIDENCE PER CENT PUERPERAL INFECTION		
	WHITE	BLACK	TOTAL
Before onset	8.59	17.79	12.85
First stage, spontaneous	13.21	21.79	17.95
First stage, operative	15.38	33.90	26.53
First stage, total	13.37	22.84	18.63
Second stage, spontaneous	9.13	16.89	13.47
Second stage, operative	9.98	17.89	14.50
Second stage, total	9.46	17.29	13.89

TABLE VI. THE INCIDENCE OF PUERPERAL INFECTION AS AFFECTED BY VARIOUS MEDICAL AND OBSTETRIC COMPLICATIONS

COMPLICATION	INCIDENCE PER CENT PUERPERAL INFECTION		
	WHITE	BLACK	TOTAL
Cardiac disease	11.36	10.00	10.81
Pyelitis	27.50	41.18	33.78
Syphilis	58.33	24.72	26.50
Toxemia	24.14	28.64	26.48
Placenta previa	10.00	55.56	27.08
Premature separation	10.53	47.62	30.00
Postpartum hemorrhage	16.43	25.96	21.24
Contracted pelvis	13.49	22.92	20.64
Total Clinic population	11.05	20.24	16.13

definite increase in puerperal fever coincident with the toxemias of pregnancy or whether the observed high figure is due solely to a high rate of operative deliveries in this group is not clear. Considering that almost every patient with placenta previa and premature separation of the placenta is delivered operatively, the rates noted for these two complications do not seem high. It is probable, however, that the effect of blood loss on lowering the resistance of the patient to invasion by pathogenic bacteria plays some rôle, and this supposition is strengthened by the increased infection rate in cases with postpartum hemorrhage. The actual effect of a high incidence of operative deliveries on otherwise uncomplicated cases is shown by an infection rate of 20.64 per cent in those women evidencing varying degrees of pelvic contraction, a figure 4.5 per cent above that of the general clinic population. In cases of

There was no mortality of either mothers or babies in the above series. Any temperature above 100.4° was considered morbidity, although the majority of rises in temperature were little more than the common postoperative rise during the first forty-eight hours after operation. The one case in which there was sufficient fear of infection to make a Latzko cesarean section seem hazardous but in which the condition of the patient did not warrant a more radical procedure is now presented.

CASE 22.—Mrs. E. G., gravida i, aged forty-one, was seen in consultation at New Haven Hospital. This patient had been sent into the hospital with a history of fetal death at term six weeks before. The findings on admission to the hospital were as follows: A very obese woman, weighing 270 pounds, having irregular labor pains with a term size fundus, vertex presentation without engagement, no fetal heart or movements. The vagina was very tight, the cervix high, admitting the tip of a finger. At the time I saw the patient, forty-eight hours had elapsed, during which time all attempts at induction with bougie and bag had failed. The cervix was rigid, admitting one finger. The patient was in very poor condition, showing signs of beginning cardiac failure. The pulse was 120, blood pressure 160/100. She was slightly cyanosed and dyspneic and was a very poor risk for any operative procedure. Latzko cesarean section was selected as the least shocking method of emptying the uterus without directly contaminating the peritoneal cavity.

The patient stood the operation well. Postoperatively she showed a severe colon infection of the wound with a direct sinus from the abdominal incision through the lower segment of the uterus and cervix which eventually closed. She had three days of morbidity and left the hospital on her fourteenth day postoperatively with the abdominal wound still draining. The wound eventually healed satisfactorily. The fetus was badly macerated.

The technic as described by Burns was modified in this series of cases as follows: Instead of filling the bladder before the initial incision, a retention catheter was placed in the bladder before operation. This catheter was connected to a graduated hypodermoclysis bottle filled with normal saline. The patient was then prepared and draped for operation. A suprapubic incision was made through the skin and fascia down to the bladder. The bladder was then distended to the desired point, usually about 300 to 400 c.c. of fluid being instilled. From this point Burns' technic was followed exactly.

The following accidents were encountered:

1. The peritoneum was opened in three cases: Once when Burns' warning not to cut the band extending from the fundus of the uterus to the left was not heeded, once when a previous suprapubic incision

have been accepted as hospital material unless some abnormality necessitated it. The total infection rates for primiparas versus multiparas were 19.16 and 11.61 per cent, respectively.

4. The puerperium was febrile due to intrauterine infection two and a half times as often when the delivery was operative as when it was spontaneous, the figures being 30.86 and 12.26 per cent, respectively. Even the presence of a perineal tear or episiotomy with immediate repair caused a definite increase in infection as contrasted with the rate obtaining where no laceration occurred. The puerperium was febrile in almost two-thirds of those cases in whom manual removal of the placenta was necessary. In general, the risk of puerperal infection in operative cases seemed to be in direct proportion to the amount of intrauterine manipulation involved.

5. The incidence of puerperal fever increased directly with the duration of labor and the rate of increase was most rapid after the labor became prolonged. In those patients developing infection, the average length of labor was three and one-half hours more than in the group whose puerperium was uneventful.

6. It was impossible from the figures assembled to make out a case for the admission of patients early in labor. However, the situation is quite different in women admitted after attempts at delivery in their homes had failed, for 61.54 per cent of them developed puerperal infection.

7. The incidence of puerperal fever was lowest in the group of patients whose membranes ruptured either spontaneously or artificially prior to the onset of labor, although the rate obtained when rupture took place during the second stage was only 1 per cent higher. The most unsatisfactory results occurred when rupture took place during the first stage of labor.

8. An increased rate of infection occurred in the presence of most medical and obstetric abnormalities. To a great extent this increase paralleled the high incidence of operative deliveries due to the complication. It would seem that excessive blood loss either before or after delivery increased the incidence of infection in terms of a lowering of general resistance.

9. The death rate from puerperal infection for the city of Baltimore showed a seasonal variation similar to that observed for deaths due to respiratory diseases, except that the curve of the former followed the latter by about a month. However, no similar seasonal variation was observed in the incidence of puerperal infection, although figures were analyzed from a series of 25,000 deliveries. It is possible that seasonal variation in the virulence of invading bacteria provides the explanation for this discrepancy.

Santoro, Giuseppe: Report of Two Hundred Blood Transfusions, *Calabria Medica* 1: 13, 1935.

The author reports on 200 blood transfusions administered during 23 years of practice, both in America and in Italy, for obstetric and gynecologic indications with only four cases of deaths. He reviews the literature in reference to new blood transfusion methods.

The author now adheres to the simple indirect citrated blood method initiated with venoclysis of glucose solution. However, he proposes to experiment with Becart's electrical transfuser and the Henry-Jouvelet transfusion apparatus.

He calls attention to the decided value of blood transfusion in operations for cancer, myofibroma, and also as a prophylactic and active treatment in puerperal infections and in anemic women following prolonged and massive hemorrhage.

LARGE INTRAMURAL CYSTS OF THE UTERUS WITH REPORT OF A CASE

E. C. HAMBLLEN, M.D., DURHAM, N. C.

(From the Department of Obstetrics and Gynecology, Duke University Hospital)

LARGE intramural cysts arising in the uterus and lined by true epithelium are rare. A search of the literature shows surprisingly few recorded cases. Most of the cases reported are in European periodicals. Much uncertainty exists concerning the origin and mode of production of these cysts. We have found no reports of such cysts in the American literature. This case is presented since it illustrates such a cyst; further interest is attached to the paucity of symptoms from it and its failure to complicate in any way the five previous pregnancies and the present one of the patient.

The patient was a negress, aged thirty-six years, first seen by me May 9, 1932, in the Out-patient Clinic of Duke Hospital. She was referred to me by her local physician, Dr. C. A. Flowers, of Wendell, N. C., for operation for a pelvic mass, thought to be either a fibroid or a cyst of the ovary. The patient asserted that she had not noticed any abdominal mass until the last three months. She had had no acute abdominal symptoms from its presence. There had been a "dull aching pain" in the left lower abdomen and a "feeling of heaviness" in the pelvis which had become gradually more marked during the past two months. There had been some frequency and urgency of urination during this same period of time. She had not menstruated since March 26, 1932, when she had a normal flow of six days' duration. Her previous period had occurred the early part of February, 1932, and lasted intermittently the entire month. Previous to this there were no menstrual irregularities. She thought that she might be pregnant, but was sure that there was "something wrong" in her pelvis. There had been no morning nausea or any other subjective symptom of pregnancy.

Family history contained no relevant facts.

Past history was that of good health and of an active life. She had had the usual childhood diseases without untoward sequelae. She had had a goiter since she was sixteen years of age; it had never caused her any symptoms; she believed it to be smaller than previously. She had had none of the acute febrile diseases; no accidents, injuries or operations. Review of systems was essentially negative.

Menses began at thirteen years of age and had always been normal in rhythm and in duration and amount of flow except as interrupted by her previous pregnancies. No unusual menstrual symptoms had been experienced.

Marital history: she had been married sixteen years; husband's health was good. There had been five uncomplicated pregnancies, parturitions and puerperiums; all five children were alive (ages: 12, 9, 7, 5, 2).

Physical examination: an undernourished, colored woman of 36 years in no acute pain. There was generalized scabies. Dental caries and loss of teeth were marked. The thyroid was symmetrically and moderately enlarged and somewhat nodular. No signs of hyperthyroidism were elicited. Heart was not enlarged; heart sounds normal; no murmurs; no thrills, rate, regular, 78. Lungs were normal to percussion

One of my obstetric cases was interesting in this connection. The mother, a multiparous negress, seemed to have almost complete control over her labor. Upon arrival at the patient's home, we found no evidence that labor had begun, but she delivered a very large child in less than an hour with no evidence that it was any ordeal.

Circumstances, a few years later, revitalized the question. I had been sent to British Guiana, South America, to conduct a health campaign, and during fifteen months of my time there I lived on the edge of the jungle with a tribe of Indians for neighbors. From their chief I learned a very important fact about Indians: they love to tell "tall" stories; and the stranger who accepts these will certainly come home with a well-assorted stock of misinformation. I did not ask him about childbirth among his people because he was one of the worst liars I have met.

But I also lived for some time with Mr. Howard King, a magistrate, who had spent most of his life among the Indians of the colony. In his home, and elsewhere, I met other men who had had similar experience. From such men I learned about the habits and customs of the aborigines of the colony, including knowledge of reliable literature.

These men, and the authors they recommended, were agreed that easy labor was the rule among the Indian women. The custom of *couvade* prevailed. The women never rested after the event but the buck would take to his hammock for ten days to fool the evil spirits and draw them away from the newborn child. During this time the squaw took care of the baby, the father, and herself, and showed no signs that she was not fully capable of doing so.

The general statements of the ease with which the women bore children were backed up with numerous incidents of which the following, known personally to Mr. King, is a fair sample:

An Indian woman, paddling alone in her dug-out canoe, felt labor coming on. She paddled to the bank of the river, had the child, cared for it, reembarked and paddled the twenty miles which lay between her and her camp. She showed no sign of weakness when she arrived, and he was sure this and similar incidents were not evidence of Indian stoicism. Labor was not an ordeal.

I saw enough of the Indian women to learn that they were emphatically not in better physical condition than civilized women. They were, on the contrary, mostly in very bad condition. Hookworm disease and malaria were rife among them. Syphilis was very common. They went around with bare abdomens, and it was nothing unusual to be able to see the edge of their spleens from a distance of ten feet. Hemoglobin counts as low as thirty were found and the average was about fifty. The average coastal Indian woman of British Guiana could not survive labor if it were the ordeal it commonly is among women in this country. They had easy labors, but not because of good physical condition. Reports from other places where health conditions were better showed that it was not a matter of physical development at all. The cause lay in some other field.

Diagnoses were: cystadenoma of left ovary; colloid goiter, scabies, and mild hypertension. Patient was admitted to the hospital for operation; basal metabolism rate and local treatment of scabies were done preoperatively. A Friedman pregnancy test was reported as positive. On this basis a diagnosis of early pregnancy and left ovarian cystadenoma was made. Basal metabolic rate determination was plus 3 per cent.

Operative Findings: Laparotomy, May 11, 1932, under spinal anesthesia, induced with 150 mg. of neocaine. The appearance of the pelvic tumor mass is shown diagrammatically in Fig. 1 with insert. The main left abdominal portion of the mass comprised a uterus containing a pregnancy of approximately two and one-half to three months. The right, posterior and pelvic portions of the mass were cystic; the pregnant uterus rested upon the cystic portion of the mass which filled the culdesac in such a way that the entire pregnancy was abdominal in situation with a portion of cervical canal also lying above the symphysis. There was no line of demarcation between the two portions of the tumor. Muscular coating of the cystic portion of tumor gradually thinned in the right, posterior and lower portions, and here the mass appeared quite bluish white and cystic. The tubes and ovaries which were normal had their usual anatomic location as referred to the pregnancy portion of the tumor; the cyst was associated intimately with the pregnant portion in its right lateral, fundal and posterior portions, the right tube, round ligament and ovary lying anterior to the cystic portion. The left ovary contained the corpus luteum of pregnancy. A supravaginal hysterocystectomy was done. Routine pelvic repair and reperitonealization and closure were done. Patient stood the operation well, made an uneventful recovery and was discharged from the hospital April 23, 1932. A postoperative visit from the patient on July 18, 1932, and subsequent reports from the doctor indicated an uncomplicated convalescence and return to duty.

Pathology Report.—(Dr. R. H. Rigdon) *Gross examination:* (See Figs. 2 and 3). The specimen consisted of uterus with a cystic mass which was a part of the fundus of the uterus. The uterus had been amputated near the internal os. The uterus and cyst measured 22 cm. in its greatest diameter. The uterus had a diameter of 8.5 cm. while the greatest diameter of the cyst was 13 cm. There were a few fibrous adhesions over the uterus and the cyst. There was no definite line of demarcation between the cyst and uterus. There was only an increase in the diameter of the cyst as it originated from the uterine wall. The round ligament on the right side apparently had its origin from the junction of the cyst with the uterus.

Both fallopian tubes have been sectioned near the body of the uterus. The uterus is somewhat soft in consistency and normal. On section the cyst is filled with a straw-colored fluid and in the uterine cavity there is also a small amount of straw-colored fluid which is amniotic fluid. Here we find a normal pregnancy which is approximately two and one-half months. The uterine cavity measures 6 cm. in diameter and the findings here are those of a normal pregnancy. The vessels in the wall of the uterus are dilated. It is of interest to note that there is a continuation of the myometrium from the uterine wall into the wall of the cyst. This can well be traced for a distance of 7 to 8 cm. in the wall of the cyst. The thickness of the wall between the uterine cavity and the cystic cavity is 6 mm. The greater portion of the cystic cavity is relatively smooth there being in one area a large fibrous band 1.5 cm. by 3 mm. which extends across the cyst at a point 4 cm. from the fundus of the cyst. There is another band of adhesions which measure 1.5 cm. in thickness which forms a shelflike projection in the inner surface of the cyst. The wall of the cyst in the portion distal to the uterus is transparent. Numerous small blood vessels can be seen to radiate over the inner surface of the cyst. Approximately half of the cyst adjacent to the uterine cavity has a granular appearance.

may be completely destroyed by the development in the individual of certain emotional attitudes in connection with them. Analogy suggests that labor should be naturally pleasant and easy and, when it is not, the common cause of a similar state affecting other functions should be taken as the most likely cause until proved otherwise.

These items all appear to indicate that emotional disturbances are capable of making labors harder, longer, and more painful.

Question 2. Is there, between primitive and civilized women, a difference in emotional attitudes toward labor sufficient to account for the difference in the average severity of their labors?

Our study of women in their first pregnancies has already revealed various attitudes including the following:

1. *Euphoria*.—This is fairly common. Women showing this appear to be in a permanent state of elation. Questioning reveals that the euphoria covers numerous fears. Patients will admit such fears and disclose that they are making every effort to avoid thinking about them. For this latter purpose they concentrate on the happier side of pregnancy and maintain the superficial euphoria.

2. *Fear of the Ordeal of Labor*.—Every patient seen to date has eventually disclosed this fear in varying measure. Investigation shows that it is built up from early childhood by the mysterious allusions of mothers and other adults to "what mothers go through" in bearing children, together with the general mystery which is developed around the whole subject of sex. This attitude of mystery, highly developed in our civilization, makes labor appear almost a ghostly function and, as such, to be approached only in terror.

3. *Fear of Loss of Freedom*.—This fear has previously arisen in relation to the decision to marry, but comes up at this time with renewed vigor. Before children are born complete freedom may be regained by separation and divorce, but after the birth of a child the mother is committed to give the next twenty years to its care.

4. *Fear That the Marriage May Not Succeed*.—Because the birth of the child cements the marriage, this fear becomes prominent in cases where good adjustment between husband and wife has not occurred.

5. *Fear of Inability to Live Up to the Ideal of Motherhood*.—With the approach of their first labor, many women realize that they are not the saintly creatures, with almost divine powers, that mothers are supposed to be. They hope that the miracle will occur, in connection with labor, to make them over into the traditional mold, but still have their doubts and fears. These are focused on the labor.

6. *Fears of the Influence of Heredity*.—If the prospective mother knows that members of her family have had hard labors, she fears she is destined to have a similar one. If she is aware of delinquency, crime, mental, or physical disease in the families of herself or husband, she fears any or all of these may be transmitted to her child. She fears, as a result, to see her child and this leads her to fear the labor which will bring it forth.

7. *Fear Growing Out of the Belief That Childbearing Should Be a Martyrdom*.—This is a curious but very powerful belief, reinforced by religious doctrines. It makes women feel that pain and travail are prerequisites to true motherhood. Its power was illustrated in the historical incident with which you are probably all familiar. When Simpson discovered chloroform and began to use it in obstetrics, the clergy rose in arms and had almost succeeded in getting a bill through Parlia-

layer of columnar epithelium. At many points along this epithelium there are small papillary-like projections into the lumen of the cyst (Fig. 4). The muscular tissue present in this portion of the cyst wall corresponds exactly to that in the wall of the uterus. It is of interest to note that as one proceeds along the wall of the cyst from the uterus the amount of muscular tissue decreases and the amount of stroma between the muscle bundles increases.

DISCUSSION

Cysts may occur subperitoneally or in the endometrium or myometrium. Haarbleicher¹ who reviewed the literature prior to 1910 on intramural cysts found only 11 cases and added notes on 3 additional ones which had been reviewed. Of these only 3 perhaps were suggestive of congenital origin. There are many views as to the origin of the congenital cysts: from the wolffian body (Recklinghausen²); from Gartner's ducts (Rieder³); from müllerian ducts (Kossmann⁴); from epithelium of endometrium (Chiari⁵); from endothelium of peritoneum (R. Meyer⁶); from lymphatic canaliculi (Blount⁷). Acquired ones may arise from inflammation (R. Meyer⁶); from accidental implantation and traumatism (Risch⁸) or in the course of the regeneration of the endometrium after delivery (Recklinghausen²). Aschoff⁹ notes the general origin of cysts is from the absorption of necrotic tissue, from dilatation of preexisting cavities, and from neoplastic processes with closed cavity formation. Many of the acquired cysts of the uterus originate as a result of cystic degeneration of fibromyomas and adenomyomas (Cullen¹⁰).

We shall limit this discussion to a consideration of intramural cysts, omitting those of the cervix, subperitoneal and endometrial ones and those as a result of degeneration of fibromyomas or adenomyomas.

Intramuscular cysts may occur in any portion of the body of the uterus, in the cornual portion, near the fundus, or in the isthmus. As a rule these cysts are quite small and many are found only in the course of routine pathologic studies after operations or autopsy. These cysts may reach large size and require laparotomy, the preoperative diagnosis being usually, ovarian cyst or fibromyoma. Rosenthal¹¹ reports an instance in which the cyst attained the size of a term pregnancy. Large cysts have been reported also by Ottow,¹² Fukushima,¹³ Pribram,¹⁴ Dworzak,¹⁵ Fink,¹⁶ Knauer,¹⁷ Breus,¹⁸ Amos,¹⁹ v. Arx,²⁰ Frankl,²¹ v. Jaschke,²² Küstner,²³ Stühler,²⁴ Haarbleicher,¹ Stuffer,²⁵ Candelet,²⁶ Péan.²⁷ In none of these instances was the diagnosis made preoperatively. The majority of these occurred in women in the fourth and fifth decades of life. The period of duration of symptoms from these tumors was relatively short: three to nine months in the majority of instances. The only symptoms which were attributed generally to the cyst were lower abdominal enlargement and pressure on adjacent viscera. None of these cases was associated with pregnancy or recent pregnancy.

Due to the rarity of these cysts, no one individual has had the opportunity of studying more than two or three specimens, and therefore, our knowledge as to their character is quite imperfect. The origin of these cysts is the chief point of contention. Haarbleicher¹ notes: "A sufficient number of these cases have not yet been reported to confirm the many theories of possible origin. The origin from Gartner's canal appears to have at present the most cases in support of it." The work of Recklinghausen,² Rieder³ and others has shown the persistence of Gartner's canal. Wolff²⁸ says that Rieder found residual Gartner's ducts in 30 per cent of uteri examined and R. Meyer in 22.2 per cent of the cases. There is much doubt as to the persistence of the wolffian body in the uterine wall; Robert Meyer⁶ does not believe that there occurs any such remains; Frankl²¹ is of the same opinion and states that a glandular tumor in the middle of the fundus can never arise from

peared to derive from the internal conflicts of the individual parents. Emotional states, in brief, are contagious. This contagion, in such forms as the hysterias which develop in war time and those which lead to mob violence generally, are familiar to all of us. Children are particularly susceptible to this contagion and reflect, as a result, the emotional atmosphere of the home as it is focused onto them.

Recognition of the importance of the parental attitudes and conflicts led to efforts to treat the parents who brought children to psychiatric clinics. It was found, however, that this is difficult in practice. The pathologic situation has commonly developed too far; the parents have not only convinced themselves that they are blameless, but that their own disturbances are caused by the other parent or the child himself. Many parents will refuse to consider the possibility that they require treatment. Others admit it in words but prove very resistant. Under such circumstances, treatment often proves unsatisfactory.

In this state of resistance, parents usually back up their arguments by quoting various popular and unsound beliefs. They insist that the child's nervousness or misbehavior is the result of an injury to the head, the influence of bad boys in the neighborhood, temptation by the devil, the hereditary transmission of evil or weak traits (usually through the other parent), and other similar and unproved causes. When these are not accepted by the psychiatrist, the mother falls back upon the familiar defense that the psychiatrist, after all, is not a mother and only mothers can understand their children.

Study of such parental emotional states and the unsound beliefs behind which they were barricaded showed that they derived from the grandparents and were inculcated during the infancy of the parents. They were, therefore, present in the parents before the marriage and birth of the children. Could they be elicited and treated before they had become so firmly established and before they had seriously damaged either the marriage or the children? The search for a time and place where this might be done led to the tentative choice of the prenatal clinic and the limitation of the work to apparently normal women in their first pregnancies. With one exception, the women were seen only on their regular prenatal visits to the clinic.

Even somewhat superficial studies of fifteen apparently normal women revealed conflicts and beliefs and attitudes in each of them which have been recognized as causes of marital discord. Slightly more than half claimed to be sexually frigid. Most of them admitted, and the rest showed other evidence, of the belief that the martyrdom of labor would confer on them the right and power to dominate the family. Most of them, even those who admitted feeling better than ever before in their lives, were already demanding all sorts of special consideration from their husbands and others simply because they were pregnant.

REFERENCES

- (1) *Haarbleicher, E. B. M.*: J. Obst. & Gynec. Brit. Emp. 17: 208, 1910. (2) *v. Recklinghausen*: Die Adenomyome und Cystadenome des Uterus und Tubenwandung-ihre Abkunft von Resten des Wolffschen Körpers, Strassburg, 1896. (3) *Rieder*: Arch. f. path. Anat. von Virchow 96: 100, 1884. (4) *Kossmann*: Arch. f. Gynäk. 54: 359, 1897. (5) *Chiari*: Ztschr. f. Heilk. 8: 457, 1887. (6) *Meyer, Robert*: Ztschr. f. Geburtsh. u. Gynäk. 49: 464, 1903. Virchows Arch. f. Path. Anat. 172: 394, 1903. Ztschr. f. Geburtsh. u. Gynäk. 47: 401, 1902. Ztschr. f. Geburtsh. u. Gynäk. 38: 234, 1898. Über Epithel Gebilde in Myometrium bei Feten u. Kindern, Berlin, 1899. Ztschr. f. Geburtsh. u. Gynäk. 42: 43, 44, 1900-1901. (7) *Blount, A. E.*: Am. J. Obst. 52: 210, 1905. (8) *Risch*: Traumatische Epitheleysten der Vagina (quoted by Haarbleicher). (9) *Aschoff, L.*: Cysten. Ergebnisse der Allgemeinen Pathologie, Jahrgang 1895; 2nd year, 456-565 Lubarsch, Ostertag. (10) *Cullen, T. H.*: Tr. South. Surg. & Gynec. Assn. 25: 142, 1912. *Cullen and Kelly*: Myomata of the Uterus, Philadelphia, 1909, W. B. Saunders Co. (11) *Rosenthal, I.*: Cystis intramuralis uteri e canali Gartueri, Endometritis polyposa, Medycyna, Varsovie, April 22, 1900. (12) *Ottow, B.*: Ztschr. f. Geburtsh. u. Gynäk. 94: 540, 1928. (13) *Fukushima, K.*: Zentralbl. f. Gynäk. 2: 2238, 1927. (14) *Pribram, E.*: Arch. f. Gynäk. 129: 271, 1927. (15) *Dworzak, H.*: Arch. f. Gynäk. 150: 631, 1932. (16) *Fink, K.*: Zentralbl. f. Gynäk. p. 299, 1929. (17) *Knauer*: Zentralbl. f. Gynäk. p. 498, 1895. (18) *Breus*: Über wahre Epithel führende Cystenbildungen in Uterusmyomen. Wien. Deuticke, 1894. (19) *Amos*: Ztschr. f. Geburtsh. u. Gynäk. 58: 347, 1906. (20) *v. Arx*: Ztschr. f. Geburtsh. u. Gynäk. 79: 52, 1917. (21) *Frankl, O.*: Arch. f. Gynäk. 93: 649, 1911. (22) *v. Jaschke*: Ztschr. f. Geburtsh. u. Gynäk. 69: 77, 1911. (23) *Küstner*: Ztschr. f. Geburtsh. u. Gynäk. 80: 666, 1918. (24) *Stübler*: Zentralbl. f. Gynäk. 26: 1065, 1923. (25) *Stufler*: Lucina Bologna 10: 151, 1904. (26) *Candélet*: Bull. Soc. Anat. 13: 392, 1868. (27) *Péan*: Kyste interstitiel des parvis de l'utérus, *Leçons de Clinique Chirurgicales*. T. 111, p. 980 (and Mercadé). (28) *Wolff, E.*: Ztschr. Path. 35: 441, 1927. (29) *Mercadé, S.*: Kystes et Abscès de l'utérus, Thèse de Paris, 1905-1906. (30) *Amann, J. A.*: Über Neubildungen der cervical Portion des Uterus, München, 1892.

CERVICAL CARCINOMA IN A GIRL OF SIXTEEN YEARS*

DAVID B. LUDWIG, M.D., PITTSBURGH, PA.

(From the Department of Gynecology, Columbia Hospital, Wilkesburg, Pa.)

THE literature on this subject discloses a very small number of patients below twenty years of age with carcinoma of the cervix, especially if there has been no pregnancy. The percentage of cases of carcinoma of the cervix in nulliparous women is variously given as 2 to 8 per cent. In studying the reports of carcinoma of the cervix in patients of twenty years of age or younger, and especially in children, various authors question the diagnosis of carcinoma, in many cases considering the growth as a teratoma or sarcoma rather than carcinoma.

The literature was reviewed by Bonner in 1927, Morse in 1930, and Baldwin in 1931, with report of a case by Bonner and one by Morse. During the forty-eight years which these reviews covered, there were reported but six authentic cases of carcinoma of the cervix in individuals between the ages of sixteen months and fourteen years and 7 cases between the ages of sixteen and twenty years.

The patient, white, aged sixteen, was referred to me by her family physician Jan. 7, 1930. For six months there had been a dark brown bloody vaginal discharge that was present almost constantly though scant in amount. There had been slight pain in the lower abdomen and pelvis and some burning in the vagina.

*Read at a Meeting of the Pittsburgh Obstetrical and Gynecological Society held April 8, 1935.

human beings. If she, as a result, later tells us that mothers have a different and superior understanding of their children, we can blame her only for accepting what society has thrust upon her, for this is a logical outgrowth of such efforts. At least part of the women were trying hard to resist this stream of suggestion, but it is very powerful.

FRIGIDITY

Our cases of frigidity supplied evidence on the etiology. None of our cases gave any support to the popular idea that this condition results from lack of consideration or faulty technic on the part of the husband. All of the women reported, on the contrary, that their husbands had made every effort to satisfy them throughout the marriage. One woman volunteered that she believed she would be more likely to respond if her husband would stop bothering about her reactions. She explained that his attitude took away all spontaneity and made coitus seem a task.

Neither did frigidity appear to be a primary cause of conflict but rather a result of emotional conflicts and beliefs of the women relating to the subjects of sex and marriage in general, or their own particular marriages. All of these appeared to have been developed during the childhood and adolescence of the women and therefore long before they had even met their husbands.

One of these was the belief, fostered by parents and teachers, that nice women should not and do not have sexual desires and feelings. The increasing freedom of speech and behavior granted to young women in recent years does not usually change this belief, because it has been inculcated and repressed years earlier. Even a conscious contrary belief does not necessarily correct it.

Another important deterring belief includes a fixed mental picture of the joys of coitus which develops out of the romantic ideas and beliefs we commonly inculcate in girls and young women. Love stories all emphasize the point that the consummation of true love brings with it an adequate reward regardless of outside circumstances. The girl logically concludes that the joy of this consummation is something wonderful and almost beyond mental conception. She tries to imagine what it may be like and, out of this, builds an anticipation which is beyond the possibility of satisfaction in reality. Then, when the reality fails to meet this false conception, she feels disappointed and frustrated. In one patient, who recovered, this seemed to be the sole cause.

A third cause has been mentioned in connection with fear of the first labor, namely, the fear that they have made a mistake in deciding to marry or in the choice of a mate. To these women successful coitus is a symbol of successful marriage. They believe that having orgasms commits them to the marriage. Then, doubting whether they want to be

weight was 128 pounds and her height was 5 feet 5 inches. She did not know of any loss of weight since the beginning of the bleeding. Her color was fairly good. The abdomen was not distended. Palpation revealed tenderness just above the pubes, but no mass was demonstrable. R.B.C. 3,900,000, W.B.C. 9,500, and Hb. 76 per cent. The Wasserman test was negative.

Though vaginal examination at the office was unsatisfactory, several pieces of tissue from a soft friable intravaginal growth were secured. The pathologic examination was made by Vandergrift who diagnosed the condition as adenocarcinoma of the cervix.

The patient was admitted to the Columbia Hospital Jan. 8, 1930. Vaginal examination, under anesthesia, was done the following day. A soft, friable mass filled the upper half of the vagina, and the entire circumference of the cervix was involved, the right side to a greater extent than the left. The portion of the growth of the left side was firmer than that of the right side. Upon manipulation the mass bled considerably. The uterus was a little enlarged and situated in the long axis of the body. The tubes and ovaries were not palpated.

Operation was performed as follows: The cervical opening was dilated and the uterus curetted. No curettings were obtained. Three portions of tissue were removed from the cervical growth for laboratory examination, following which the remainder of the cervix was amputated by cautery. At this time 3160 mg. hours of radium were used. X-ray treatment was instituted three weeks later at the Westmoreland County Hospital.

Pathologic report by Dr. Vandergrift:—The sections showed a fibromuscular structure with epithelial masses invading one side. The cells were large, and vesicular nuclei were arranged in small masses. Some of these masses were isolated in the fibromuscular tissue. Others showed numerous massed columnar glandlike structures with only a very scant stroma and a few capillaries. These glandlike structures were not definitely outlined and the cells were not arranged in an orderly manner. Many mitotic figures were seen. *Diagnosis:* Adenocarcinoma of cervix. A section of this specimen was also examined by Dr. Haythorn at the Singer Memorial Laboratory.

Five months later the patient received 1425 mg. hours of radium application and following that she was reexamined at intervals of two or three months for the next eighteen months. Nine months after the operation there was slight bleeding from the vagina following examination, but there was no evidence of recurrence of the growth. Eighteen months after the operation the patient complained of some discomfort in the rectum. Examination revealed a small reddened area on the anterior aspect of the rectum about an inch from the anal orifice. Subsequent examination at a later date showed no evidence of any inflammatory process of the rectum but there was some perianal pruritis.

The second year after operation the patient had a moderately severe attack of cystitis and pyelitis on the left side, which lasted intermittently for two months. Six months later another attack of cystitis developed, which was mild and of short duration. The patient reported for reexamination every three to six months during the years 1932, 1933, and 1934. May 27, 1933, there was a slight amount of non-sanguinous mucoid discharge from the vagina. The uterus was normal in size and was partially fixed. There was induration along the left broad ligament and a lesser amount of induration posterior to the uterus. The inflammatory process was quite well absorbed within three months. July 4, 1933, menstrual periods were resumed, occurring every twenty-eight days, with excessive bleeding on two occasions. Two periods were prolonged.

tion had accidentally occurred before they intended, and they now feared that their child, conceived as a result of carnal pleasure, would be unsatisfactory, perhaps bestial or deformed. The manner in which germ cells mature by discarding half of their genes was described to show that inheritance is determined some time before coitus occurs, which the woman accepted as proof of the falseness of their belief. At her request, the husband was also seen and the subject discussed with him.

The importance of eliciting and attempting to correct a belief of this sort can hardly be overemphasized. Otherwise the child will be rejected by the parents before birth, and such rejections are a source of great emotional disturbances in both parents and children.

RESULTS

Nineteen patients, all primiparas, had undergone labor at the time of writing. The average time of their labors was sixteen hours and fifteen minutes as compared with the average of eighteen hours given in textbooks, a decrease of one hour and forty-five minutes. None of these patients were seen by the psychiatrist during their labors. Both Watson and Draper suggested the need for this but other duties of the author have made it impossible. The number of cases is too small to prove anything but the decrease in time, especially without treatment during labor, is encouraging.

We also feel more hopeful regarding the efforts to prevent future mental disturbances. Final results should be measured only after the women and their families have been followed over a period of years in order to measure, as far as is humanly possible, the degree of emotional disturbances against the average in the same number of untreated mothers. We are now attempting to work out a rough yardstick for this purpose. Definite manifestations of disturbance such as behavior problems in the children and separations of parents will receive the most attention.

But even without this proposed follow-up, we feel that we accomplished something. In both cases reported there was evidence that a definite decrease in emotional tension occurred. In the second case the woman voluntarily reported that the whole atmosphere of the home had been changed for the better. Whether these changes will persist only time will show.

Three cases of sexual frigidity cleared up during the prenatal period. All of the women who complained of this condition were taught that it was their own disability which could be treated psychiatrically if it persisted, and appeared to accept this. Even this should prevent part of the evil results that commonly follow the persistence of the condition because most women eventually decide that the fault lies with their husbands and begin to blame them. From this to separation, divorce, and seeking a new mate are but short steps. The women seen may, instead, seek treatment for themselves.

An effort was made to teach all the women that misbehavior on the part of their prospective children would mean that they or others who handled their children were suffering from emotional disturbances which

The endometrium, besides the decidual section, shows considerable hyperplasia. The glands are lined by several layers of cells, and show peg formation, and secretory activity. The endometrium shows no invasion by hyperplastic syncytial, and Langhans' cells.

Pathologic Diagnosis.—Placental tissue (pregnancy).

The patient seemed to make a satisfactory convalescence from the curettage and was discharged from the hospital on August 23. However, on the morning of her discharge she complained of nausea which grew progressively worse after her return home until it ceased suddenly following a profuse uterine hemorrhage, August 26. More or less constant bleeding, at times profuse, continued until readmission to the hospital, August 31.

Upon examination at this time the uterus was found to be somewhat larger than at the time of the first curettage. The patient's general condition showed evidence of the blood loss; hemoglobin 50 per cent, red cells 2,250,000.

At curettage, September 1, a large quantity of scrapings was obtained showing a very active degeneration and resembling somewhat a hydatidiform mole. The following is the pathologic report of these scrapings:

"This specimen consists of numerous small irregular dark masses. Sections show decidual tissue in which there are papillary structures resembling chorionic villi. The stroma is myxomatous. The epithelium in some areas is quite regular, in others the Langhan cells are seen undergoing rapid division with many mitotic figures. In some areas they appear in solid nests. It is evidently a malignant chorioma of the chorioadenoma type."

September 2 the temperature rose to 104° F. but was normal on September 3, when a blood transfusion was given and laparotomy was performed on September 4, when the entire uterus with both tubes and ovaries were removed.

Macroscopically before the specimen was incised the appearance of the tissues was perfectly normal. However, upon incising the fundus it was seen to be literally honeycombed with the infiltrating degenerating growth.

The pathologic report of these structures is as follows:

"Sections of the uterus show a similar chorioepithelioma as described in the diagnostic curettage. There are numerous strands of large irregular cells between the muscle bundles. Many show mitotic figures. There is also some granulation tissue. The ovary contains numerous small simple cysts and corpora albicantes."

On the second postoperative day the temperature rose to 104° F., rapidly receding to normal on the fourth day where it remained until her discharge, September 19, when her general condition was satisfactory.

Before her discharge from the hospital she received a course of deep x-ray therapy, four treatments of 200 kilovolts each.

Aschheim-Zondek tests October 26, November 25, and December 24 were all negative.

On November 30 bimanual examination revealed the vault of the vagina to be freely movable, there being no evidence of any induration in the pelvis nor evidence of new growth on the vaginal mucosa. In December, 1935, there was still no evidence of recurrence and the general condition was excellent.

COMMENT

This case merits reporting first, because of the rarity of the condition; second, because of its early recognition, and third, because of its apparent cure. As to the latter, naturally, it is much too early to make any prediction as to the outcome, though the negative Aschheim-Zondek tests are encouraging.

A RECORD OF 26 CASES OF RUPTURE OF THE UTERUS

CHARLES P. SHELDON, M.D., ALBANY, N. Y.

(From the Boston Lying-In Hospital and the Department of Obstetrics of the Harvard Medical School)

RUPTURE of the uterus is one of the serious accidents of pregnancy and labor which should, in the great majority of instances, be a preventable condition. The indiscriminate use of pituitary extract during labor, manual dilatation of the cervix, the employment of internal podalic version in neglected or ill-managed cases, and the widespread practice of cesarean section have kept the frequency of this alarming complication of parturition far too high. Its incidence is a fair index of the type of obstetrics practiced in a given community. Asa B. Davis¹ has brought out the fact that the hospital incidence is greater than that for the community at large, because complicated and neglected cases gravitate to hospitals. Fourteen of twenty-six cases of uterine rupture occurring in the Boston Lying-In Hospital from January, 1918, to January, 1935, were emergency cases and cannot be charged against the hospital clinic. This group includes five cases of rupture of cesarean scar in patients who were originally operated upon elsewhere.

The average frequency of this condition is probably in the vicinity of 1 rupture to 2,000 deliveries. Out of 142,625 estimated actual confinements at the New York Lying-In Hospital, Davis¹ found an incidence of rupture of the uterus as 1 in 810. Hurd² reported an incidence of 1 in about 2,000 deliveries at the Woman's Hospital in New York; 5 of 9 cases were due to version and breech extraction, while 4 occurred spontaneously in women who had previously been subjected to cesarean section or myomectomy. From 1918 to 1934, inclusive, there were 47,554 deliveries at the Boston Lying-In Hospital, among which there were 26 cases of uterine rupture, an incidence of 1 in 1,829. There were 12 cases entirely attributable to hospital management, an incidence of 1 in 3,963. There were 17 cases of traumatic rupture, while 9 originated spontaneously. Six of the latter occurred in cesarean scars.

ETIOLOGY

Rupture of the uterus is a disease of multiparity. DeLee³ states that it occurs in multiparas eight times more often than in primiparas. In this series of 26 cases, only two were primigravidas.

The average parity for the entire group was approximately 5. The mean age incidence was thirty-three years. The number of living children per patient was 2.8.

Department of Reviews and Abstracts

CONDUCTED BY HUGO EHRENFEST, M.D.

Selected Abstracts

Gynecologic Operations

Brocq, P., and Du Peaux, B.: New Statistics on the Le Fort Operation. Results in 14 Cases of Closure of Vagina for Complete Genital Prolapse Among Old Women, *Bull. Soc. d'obst. de la gynéc.* 24: 128, 1934.

The authors were able to trace 10 out of 14 women who had had a Le Fort operation for complete prolapse and found that only one had had a recurrence, two years after the operation. Since 1932 the authors have performed this operation combined with a posterior perineorrhaphy under spinal anesthesia. There have been no operative deaths. The authors collected reports of a total of 360 Le Fort operations. In this large number there were only 28 failures due in a large part to faulty technic. The authors advise against complete hysterectomy in cases of complete prolapse because this carries a mortality of 10 per cent and causes several complications. They likewise are opposed to Watkins' interposition operation and believe that the Le Fort operation possesses advantages over all other types of operations.

J. P. GREENHILL.

Frei, J.: Experiences With the Interposition Operation of Schauta-Wertheim. *Monatschr. f. Geburtsh. u. Gynäk.* 96: 135, 1934.

In Frei's clinic the interposition operation is the procedure of choice for cases of descensus of the uterus and vagina. Of the 242 operations performed in the clinic, 41 per cent were for cases of descensus, 37.5 per cent for cystocele, 7 per cent for cystocele and rectocele, 11 per cent for partial prolapse and 3.5 per cent for outspoken prolapse. In three cases the bladder was accidentally torn. In all cases, inhalation anesthesia was used. In 139 women who were still in the child-bearing age, sterilization was carried out by means of the Madlener-Walthard method. There was not a single death in the entire series. Sixty-four patients were reexamined after operation and entirely satisfactory results were observed in 62 of them. The author emphasizes that the interposition operation is excellent for descensus of the uterus and vagina and for cases of cystocele but not for cases of total prolapse.

J. P. GREENHILL.

Ahlborn, G.: Results of Prolapse Operations, *Acta obst. et gynec. Scandinav.* 13: 368, 1934.

The author attempted follow-up examinations on 104 cases of prolapse operated upon in the Upsala Academic Hospital Gynecological Clinic from 1924 to 1931.

peared to derive from the internal conflicts of the individual parents. Emotional states, in brief, are contagious. This contagion, in such forms as the hysterics which develop in war time and those which lead to mob violence generally, are familiar to all of us. Children are particularly susceptible to this contagion and reflect, as a result, the emotional atmosphere of the home as it is focused onto them.

Recognition of the importance of the parental attitudes and conflicts led to efforts to treat the parents who brought children to psychiatric clinics. It was found, however, that this is difficult in practice. The pathologic situation has commonly developed too far; the parents have not only convinced themselves that they are blameless, but that their own disturbances are caused by the other parent or the child himself. Many parents will refuse to consider the possibility that they require treatment. Others admit it in words but prove very resistant. Under such circumstances, treatment often proves unsatisfactory.

In this state of resistance, parents usually back up their arguments by quoting various popular and unsound beliefs. They insist that the child's nervousness or misbehavior is the result of an injury to the head, the influence of bad boys in the neighborhood, temptation by the devil, the hereditary transmission of evil or weak traits (usually through the other parent), and other similar and unproved causes. When these are not accepted by the psychiatrist, the mother falls back upon the familiar defense that the psychiatrist, after all, is not a mother and only mothers can understand their children.

Study of such parental emotional states and the unsound beliefs behind which they were barricaded showed that they derived from the grandparents and were inculcated during the infancy of the parents. They were, therefore, present in the parents before the marriage and birth of the children. Could they be elicited and treated before they had become so firmly established and before they had seriously damaged either the marriage or the children? The search for a time and place where this might be done led to the tentative choice of the prenatal clinic and the limitation of the work to apparently normal women in their first pregnancies. With one exception, the women were seen only on their regular prenatal visits to the clinic.

Even somewhat superficial studies of fifteen apparently normal women revealed conflicts and beliefs and attitudes in each of them which have been recognized as causes of marital discord. Slightly more than half claimed to be sexually frigid. Most of them admitted, and the rest showed other evidence, of the belief that the martyrdom of labor would confer on them the right and power to dominate the family. Most of them, even those who admitted feeling better than ever before in their lives, were already demanding all sorts of special consideration from their husbands and others simply because they were pregnant.

pelvis to the edges of the wound. Microscopic examination showed a fibrinopurulent exudate on the surface of the appendix, ovaries and tubes, the latter containing a purulent exudate which was also present between the circular muscle bundles. The postoperative course showed a decreasing temperature, 102° to 99° F., with a concomitant decrease in pulse rate. On the seventh postoperative day the temperature rose to 102.2° F. Examination of the wound on this day revealed no discoloration or abnormal tenderness, but when two sutures were removed, and the lower end of the median incision opened a large amount of pale brownish, pea souplike liquid escaped. Smears and cultures revealed morphologically and culturally characteristic gonococci. Undermining for a distance of from 1 to 2 cm. on each side of the lower 2½ cm. gap was elicitable on the twelfth postoperative day, but the underlying fascia was intact. These two openings communicated with each other. The complement fixation test for gonorrhea was positive. The wound was completely healed on the forty-second day. No pus was obtained from either the urethral or labial glands.

J. T. WITHERSPOON.

Marchese, F.: *Thrombophlebitis and Emboli Following Gynecological Operations*, *Folia Gynæc. demograph.* 31: 529, 1934.

From a very exhaustive study of literature the author finds that the incidence of thrombophlebitis and emboli is less frequent in patients who are allowed out of bed early and who are made to exercise postoperatively.

He reports on the incidence of emboli in the larger clinics and finds the variation from 0.1 per cent to 5.2 per cent. The author had an incidence of 0.16 per cent in 96 cases.

MARIO A. CASTALLO.

Bernardberg, J.: *Uterine Perforation Occurring During Curettement*, *Bull. Soc. d'obst. et de gynéc.* 24: 260, 1935.

The author reports a series of perforations of the uterus which occurred during the course of curettage. He points out that some physicians always intervene for this accident, others abstain from operation, and a third group select the cases for the course they intend to follow. He emphasizes that in some instances malformations of the uterus are responsible for this accident. In some cases where there is doubt as to the occurrence of a perforation he suggests that lipiodol be injected into the uterus.

J. P. GREENHILL.

Daniel, C.: *The Surgical Treatment of Tuberculosis of the Female Genitalia*, *Gynéc. et obst. (Bnearest)* 11: 1933.

In a series of 266 chronically diseased fallopian tubes removed at operation Daniel found tuberculosis in the removed tissue 38 times (10.7 per cent). Among these 38 cases, the tuberculous process was found in the tubes 31 times, in the uterus 2 times, and in the uterms and tubes 5 times. A radical operation was performed in two-thirds of the cases, a conservative operation in 13 per cent and simple laparotomy in 19 per cent. In one-fourth of the cases, the intestines were damaged during the course of the operation. All the patients recovered but four fecal fistulas developed. The author followed up 21 patients and found that 17 had been cured definitely, 3 were relieved, and 1 patient died.

J. P. GREENHILL.

human beings. If she, as a result, later tells us that mothers have a different and superior understanding of their children, we can blame her only for accepting what society has thrust upon her, for this is a logical outgrowth of such efforts. At least part of the women were trying hard to resist this stream of suggestion, but it is very powerful.

FRIGIDITY

Our cases of frigidity supplied evidence on the etiology. None of our cases gave any support to the popular idea that this condition results from lack of consideration or faulty technique on the part of the husband. All of the women reported, on the contrary, that their husbands had made every effort to satisfy them throughout the marriage. One woman volunteered that she believed she would be more likely to respond if her husband would stop bothering about her reactions. She explained that his attitude took away all spontaneity and made coitus seem a task.

Neither did frigidity appear to be a primary cause of conflict but rather a result of emotional conflicts and beliefs of the women relating to the subjects of sex and marriage in general, or their own particular marriages. All of these appeared to have been developed during the childhood and adolescence of the women and therefore long before they had even met their husbands.

One of these was the belief, fostered by parents and teachers, that nice women should not and do not have sexual desires and feelings. The increasing freedom of speech and behavior granted to young women in recent years does not usually change this belief, because it has been inculcated and repressed years earlier. Even a conscious contrary belief does not necessarily correct it.

Another important deterring belief includes a fixed mental picture of the joys of coitus which develops out of the romantic ideas and beliefs we commonly inculcate in girls and young women. Love stories all emphasize the point that the consummation of true love brings with it an adequate reward regardless of outside circumstances. The girl logically concludes that the joy of this consummation is something wonderful and almost beyond mental conception. She tries to imagine what it may be like and, out of this, builds an anticipation which is beyond the possibility of satisfaction in reality. Then, when the reality fails to meet this false conception, she feels disappointed and frustrated. In one patient, who recovered, this seemed to be the sole cause.

A third cause has been mentioned in connection with fear of the first labor, namely, the fear that they have made a mistake in deciding to marry or in the choice of a mate. To these women successful coitus is a symbol of successful marriage. They believe that having orgasms commits them to the marriage. Then, doubting whether they want to be

Mayer, L.: Ovarian and Uterine Grafts, Bruxelles, méd. 14: 1170, 1934.

Autogenous ovarian grafts ought to be used routinely in all women under fifty years of age who have had bilateral oophorectomy. It is important to preserve in these grafts fragments of the surface of the ovary in order to maintain the germinal epithelium and a bed for the primordial follicles. In the case of hysterectomy in women under forty years of age it is useful to add a uterine graft to the ovarian graft. This uterine graft tends to continue the uterine-ovarian hormonal relations and ovarian activity.

J. THORNWELL WITHERSPOON.

Hall, James S.: Cyst Formation in Ovarian Grafts, *Lancet* 2: 227, 74, 1934.

The reports of cyst development in extraperitoneal ovarian grafts are few. Heretofore 10 cases have been reported; the author's case totals 11. Ordinarily the grafts are placed in the abdominal wall. The amount of tissue that lives is variable.

All but two of these cysts were simple follicular ones. These two exceptions contained blood and showed lutein change. The explanation offered for these changes is that there is not the usual method whereby absorption may take place. should graafian follicles rupture.

When cysts in transplanted ovarian tissue occur, removal is the best treatment. Extraperitoneal implantation in selected cases is simple and free from danger. So far there are no recorded reports of malignancy.

H. CLOSE HESSELTINE.

Freund, R.: Brenner Tumors, *Arch. f. Gynäk.* 155: 67, 1933.

Freund found two Brenner tumors in one year in the material at the Charite in Berlin. The tumor was a large pseudomucinous one in the first patient and belonged to Group 2 of Meyer's classification. The second patient had a panhysterectomy for adenocarcinoma of the uterus and a small single isolated solid nodule was found in one ovary. This belonged to Group 1 in L. Meyer's classification. The diagnosis is based on the characteristic foci of epithelial clefts with or without central clefts and on the surrounding fibrous tissue.

These tumors have neither biologic nor clinical significance because they are usually very small in size, are benign and produce no hormonal action. Meyer believes that they arise from celom epithelium. They may develop as solid tumors in which nests of epithelial cells are embedded in the fibrous connective tissue or the cell differentiation may lead to cyst formation. In the latter type this cyst formation may go on to the formation of a large cystoma with an intramural solid Brenner tumor or nodule, with or without cyst formation. Orthmann was the first to describe this type of tumor and the author agrees with Plaut who uses the anatomic term of "benign mucinous fibro-epithelioma."

RALPH A. REIS.

Erratum

In the Item for the Committee for the Study of Sex Variants, page 759, November, 1935 issue, paragraph 6, line 3, should read: "Plans are far advanced for (1) a study of homosexuality as it exists among the members of the U. S. Merchant Marine."

tion had accidentally occurred before they intended, and they now feared that their child, conceived as a result of carnal pleasure, would be unsatisfactory, perhaps bestial or deformed. The manner in which germ cells mature by discarding half of their genes was described to show that inheritance is determined some time before coitus occurs, which the woman accepted as proof of the falseness of their belief. At her request, the husband was also seen and the subject discussed with him.

The importance of eliciting and attempting to correct a belief of this sort can hardly be overemphasized. Otherwise the child will be rejected by the parents before birth, and such rejections are a source of great emotional disturbances in both parents and children.

RESULTS

Nineteen patients, all primiparas, had undergone labor at the time of writing. The average time of their labors was sixteen hours and fifteen minutes as compared with the average of eighteen hours given in textbooks, a decrease of one hour and forty-five minutes. None of these patients were seen by the psychiatrist during their labors. Both Watson and Draper suggested the need for this but other duties of the author have made it impossible. The number of cases is too small to prove anything but the decrease in time, especially without treatment during labor, is encouraging.

We also feel more hopeful regarding the efforts to prevent future mental disturbances. Final results should be measured only after the women and their families have been followed over a period of years in order to measure, as far as is humanly possible, the degree of emotional disturbances against the average in the same number of untreated mothers. We are now attempting to work out a rough yardstick for this purpose. Definite manifestations of disturbance such as behavior problems in the children and separations of parents will receive the most attention.

But even without this proposed follow-up, we feel that we accomplished something. In both cases reported there was evidence that a definite decrease in emotional tension occurred. In the second case the woman voluntarily reported that the whole atmosphere of the home had been changed for the better. Whether these changes will persist only time will show.

Three cases of sexual frigidity cleared up during the prenatal period. All of the women who complained of this condition were taught that it was their own disability which could be treated psychiatrically if it persisted, and appeared to accept this. Even this should prevent part of the evil results that commonly follow the persistence of the condition because most women eventually decide that the fault lies with their husbands and begin to blame them. From this to separation, divorce, and seeking a new mate are but short steps. The women seen may, instead, seek treatment for themselves.

An effort was made to teach all the women that misbehavior on the part of their prospective children would mean that they or others who handled their children were suffering from emotional disturbances which

conception by Hundley's observation of definite hypertrophy of the ureteral sheath in a pregnancy of seven weeks' duration. Not in accord with my views, however, is Hundley's statement (page 647), "Hofbauer is of the opinion that hypertrophy of the ureteral sheath is the important factor in the production of dilatation of the ureter." The inconsiderable amount of hypertrophy of the muscular and connective tissue elements in the upper urinary tract, in contradistinction to the density of structure seen in the lower urinary tract, has been duly stressed in my first publication. And the point was made that the variable capacity for distention of the ureter consequent upon an obstructive ureteral lesion, may depend in great measure upon the intrinsic conditions of its individual parts. Hence, no appreciable dilatation should be expected to occur in the lower portion of the ureter during gestation while the condition of its abdominal part conduces to dilatation. Considered from this angle, Hundley's arguments against the mechanical point of view lose much of their validity.

A detailed analysis, in my second contribution to the problem, of factors which may be responsible for the dilatation and atony of the ureter during gestation, adduced experimental evidence tending to show that the depressing effect of bile salts, and consequent upon it, the lowering of surface tension of the serum may account for the loss of tone, in the pregnant state, of the uterine and ureteric muscle and for the sluggishness of the gallbladder and small intestine. Recent experimental work serves to incriminate the anterior pituitary gland, also. Ureteric atony was considered, in this address, a factor of primary significance in the etiology of the condition incident to pregnancy. At the occasion of a symposium on pyelitis of pregnancy, held (in 1933) at the meeting of the Urologic branch of the American Medical Association, I remarked: "More emphasis should be placed on atony of the ureter during pregnancy, rather than on dilatation." (*J. A. M. A.* 101: 1932.) With a view to counteract, if possible, the ureteric atony and its potential dangers, certain drugs, particularly pituitary extract, were suggested in my papers. That these have not been merely hopeful fantasies, is attested by the favorable results obtained with this treatment of certain cases of pyelitis of pregnancy by DeLee, Lower, myself, and others.

That the fetal position has no bearing upon the dilatation changes observed in the urinary tract, is being stressed in my summary in Curtis' *Obstetrics and Gynecology* (Chapter XIX).

Having failed to produce experimentally the hypertrophic changes characteristic of the ureteral structure during gestation, Hundley finally quotes his interesting observation of muscular hypertrophy of the pelvic ureter in a case of chorion-epithelioma. He considers "the prolactin elaborated by the trophoblastic tissue of the chorion-epithelioma stimulated the testicle with a subsequent outpouring of growth hormone." Without detracting from the brilliance of this conception, I am rather inclined to think in terms of augmented anterior pituitary growth hormone production, basing my arguments both on the changes known to occur in the anterior lobe of the pituitary gland in cases of chorion-epithelioma and on the experimental findings in the uterus following the parenteral administration of anterior pituitary substance (Hofbauer, Gander: *Ztschr. f. Exper. Med.* 72: 1930). Since the ureteral changes observable under such conditions are to be described in a forthcoming paper, for present purposes this need not be pursued here any further.

J. HOFBAUER.

Cincinnati, Ohio
Jan. 4, 1936

A RECORD OF 26 CASES OF RUPTURE OF THE UTERUS

CHARLES P. SHELDON, M.D., ALBANY, N. Y.

(From the Boston Lying-In Hospital and the Department of Obstetrics of the Harvard Medical School)

RUPTURE of the uterus is one of the serious accidents of pregnancy and labor which should, in the great majority of instances, be a preventable condition. The indiscriminate use of pituitary extract during labor, manual dilatation of the cervix, the employment of internal podalic version in neglected or ill-managed cases, and the widespread practice of cesarean section have kept the frequency of this alarming complication of parturition far too high. Its incidence is a fair index of the type of obstetrics practiced in a given community. Asa B. Davis¹ has brought out the fact that the hospital incidence is greater than that for the community at large, because complicated and neglected cases gravitate to hospitals. Fourteen of twenty-six cases of uterine rupture occurring in the Boston Lying-In Hospital from January, 1918, to January, 1935, were emergency cases and cannot be charged against the hospital clinic. This group includes five cases of rupture of cesarean scar in patients who were originally operated upon elsewhere.

The average frequency of this condition is probably in the vicinity of 1 rupture to 2,000 deliveries. Out of 142,625 estimated actual confinements at the New York Lying-In Hospital, Davis¹ found an incidence of rupture of the uterus as 1 in 810. Hurd² reported an incidence of 1 in about 2,000 deliveries at the Woman's Hospital in New York; 5 of 9 cases were due to version and breech extraction, while 4 occurred spontaneously in women who had previously been subjected to cesarean section or myomectomy. From 1918 to 1934, inclusive, there were 47,554 deliveries at the Boston Lying-In Hospital, among which there were 26 cases of uterine rupture, an incidence of 1 in 1,829. There were 12 cases entirely attributable to hospital management, an incidence of 1 in 3,963. There were 17 cases of traumatic rupture, while 9 originated spontaneously. Six of the latter occurred in cesarean scars.

ETIOLOGY

Rupture of the uterus is a disease of multiparity. DeLee³ states that it occurs in multiparas eight times more often than in primiparas. In this series of 26 cases, only two were primigravidas.

The average parity for the entire group was approximately 5. The mean age incidence was thirty-three years. The number of living children per patient was 2.8.

to limiting the search for infarction to merely a surface inspection of the placenta. The infarcts are best demonstrated by fixing the entire placenta, stripped of its membranes and adherent blood, in 10 per cent formalin solution for two weeks and then examining by cutting it in strips of not more than 1 cm. in thickness.

Infarcts of slow development are white, sharply outlined, firm, and are usually found on the margin of the placenta (Fig. 14).¹ This type of infarct is never responsible for toxemia of pregnancy.

Infarcts of rapid development, first described by Young³ in 1914 appear as dark areas having a homogeneous, fused, melted appearance, in distinct contrast to the surrounding lighter colored, spongy normal placental tissue (Figs. 6 and 10).¹ A more detailed description of the microscopic appearance, and the correlation of the pathology and the toxic effects, of the more acute types of infarcts have been recorded in our first communication,¹ to which the reader is referred.

At the time of our first study on the relation of placental infarcts to eclampsia, the frequent finding of obliterative endarteritis indicated that this process was apparently responsible for the occurrence of the nontoxic firm white infarcts so frequently found in mature placentas. This, however, did not adequately explain the evidences of sudden extravasations of blood which appear so frequently as small collections of yellow fibrin beneath the amnion on the fetal surface of the placenta, or in massive form, as shown in Fig. 5;¹ neither did it satisfactorily explain the fresh or recent extravasations of considerable size, in the substance of the placenta as shown in Fig. 10.¹ Young³ considered these areas of hemorrhage to be due to disturbances in the maternal circulation at the placental site, but in view of the sinuslike circulation at the placental site and the unusually free communication between the villi, it is difficult to explain their origin in this way.

To one of us (R. A. B.)¹ it seemed not only reasonable but probable that the impact of vigorous fetal movements on the exposed vessels on the surface of the placenta accounted for the evidence of thrombosis or rupture of the vessel at the site of trauma, with resulting infarction of the dependent placental tissue.

While the factor of trauma seemed to be the exciting cause of thrombosis or rupture of the fetal arteries, the tendency to obliterative endarteritis remained unexplained and did not seem to be entirely adequate as a predisposing cause of the thrombosis or rupture following trauma. Furthermore, it seemed difficult to explain the rare but occasional occurrence of eclampsia at the fourth or fifth month of pregnancy when the fetal movements are obviously only mild.

Throughout the entire period of study of placental infarcts, one of us (R. A. B.) has been impressed, not only with the tendency to obliterative endarteritis, but also with an occasional peculiar irregular thickening and bulging of the inner layer of the placental arteries, apparently

CASE REPORTS

TRAUMATIC RUPTURE

CASE 1.—(Hospital No. 24191.) 1918. Mrs. C., aged thirty-two, gravida vi, para vi, was admitted at term as an emergency case, in active labor of fourteen hours' duration. She had had one cesarean section, followed by two pelvic deliveries; the first terminated spontaneously, and the second by forceps. Examination revealed a transverse presentation (R. SC. P.). An arm had been prolapsed approximately nine hours. She was in marked shock; the pulse was barely perceptible. The uterus was of ligneous consistency. The fetal heart was absent. The flanks were dull to percussion.

Vaginal examination, under ether anesthesia, revealed a shoulder impacted in the pelvis. Decapitation was unsuccessfully attempted. Craniotomy was then performed, but the head could not be delivered as the cranioclast continually slipped off. An internal podalic version, however, was accomplished without difficulty.

Intrauterine examination revealed a large rent in the posterior wall of the lower segment through which intestines were palpated. The uterus was packed after manual extraction of the placenta. A supravaginal hysterectomy was performed twenty-eight hours later. The patient died thirty minutes after operation, without transfusion.

CASE 2.—(Hospital No. 25892.) 1919. Mrs. D., aged forty-five years, gravida v, para v, was admitted at term, as an emergency case, in active labor of twenty-four hours' duration. Examination disclosed a transverse presentation. A contraction ring obviously was impeding labor. The fetal heart tones were inaudible. The patient was in shock; the pulse was 124, temperature 99°, and respirations 40 to 50.

At pelvic exploration, the cervix was found to be one-half dilated. The dilatation was completed manually. The baby was delivered by internal podalic version and extraction. The breech was turned with great difficulty, although no particular trouble was encountered in delivery of the trunk and shoulders. Very strong traction on the neck would not dislodge the head, which seemed to be wedged in the pelvic brim. It was finally delivered with forceps after craniotomy had been performed.

Internal examination revealed the lower uterine segment completely torn across, and the examining hand could be inserted directly into the peritoneal cavity. A supravaginal hysterectomy was performed forty hours after rupture, but the patient died four hours and twenty minutes later, without transfusion.

CASE 3.—(Hospital No. 27867.) 1921. Mrs. G., aged thirty-seven years, gravida vi, para vi, was followed in the prenatal clinic. She was admitted in active labor, with a vertex presentation (L. O. P.). The baby seemed unusually large. The cervix was one-half dilated. The fetal heart became irregular after seventeen hours of active labor. Delivery was decided upon, but in attempting to convert the position to R. O. A., a loop of cord prolapsed and was found to be pulsating feebly. Internal podalic version and extraction were accomplished with great difficulty. The baby was stillborn and weighed 14½ pounds. The cervix was sutured to control bleeding, but the uterine cavity was not explored. The temperature and pulse rose steadily after delivery, the former going to 103°, and the latter to 120. Death occurred on the seventeenth postpartum day as a result of general peritonitis and septicemia.

Autopsy revealed a rupture of the uterus posteriorly into the pouch of Douglas, and a second rupture into the perirectal tissues.

CASE 4.—(Hospital No. 28007.) 1921. Mrs. McL., aged twenty-four years, gravida iii, para iii, admitted after an unsuccessful attempt at forceps delivery at home. She had been in labor ninety hours; membranes ruptured sixty-five hours. Vertex presentation, head high. The cervix was fully dilated. Forceps was again

coronary arteries, which apparently had so altered the lining and caliber of the vessels as to induce thrombosis, followed by infarction and sudden cardiac death (Fig. 3). Since the appearance shown in Fig. 4 is apparently specific for vascular changes produced by cholesterol, the



Fig. 3.—"Human coronary artery in Case 3; $\times 130$; fibrosis replacing lipoid cells." Leary,⁴ Fig. 13-B.

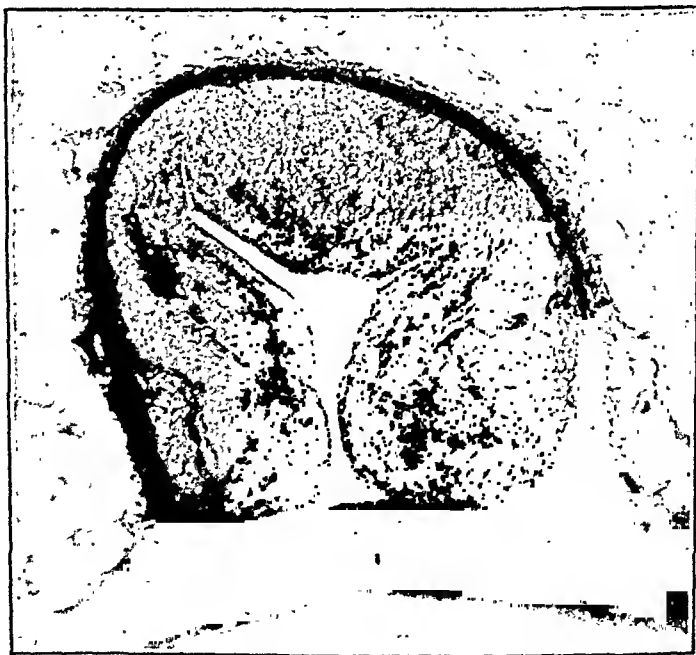


Fig. 4.—"Aorta with left coronary artery of rabbit; $\times 65$." Leary,⁴ Fig. 22.

similarity in appearance of the changes in the human coronary (Fig. 3), and in the placental arteries (Figs. 1 and 2) indicates a cholesterol effect, which in the latter, readily explains a tendency to thrombosis occurring spontaneously or as the result of trauma of fetal movements, with resulting placental infarction and toxemia.

CASE 8.—(Hospital No. 29220.) 1922. Mrs. O., aged forty-two years, gravida vii, para vii, was sent to the hospital as an emergency case. She had been in active labor for six hours prior to her admission, during which time she was under the care of a physician who apparently had attempted to deliver her. She had one living child, while five had died by the second day of unknown causes. She was very weak on admission. The pulse was 150 and of poor quality. There was free vaginal bleeding. A loop of cord and one arm were prolapsed. Internal version was done with considerable difficulty. Following expulsion of the placenta there was profuse bleeding, and uterine tamponade was resorted to. There was moderate staining through the pack for two days, when fecal material began to discharge from the vagina. There was vomiting and abdominal distention on the following day. Death occurred on the fourth postpartum day after the development of signs of pneumonia at the left base. Two transfusions were given during the puerperium.

Necropsy revealed a ragged rent, 6.5 cm. long, which extended through the upper part of the vagina and adjoining cervix on the right and opened into a large irregular abscess of many pockets in the right broad ligament.

CASE 9.—(Hospital No. 33118.) 1925. Mrs. F., aged twenty-seven years, gravida ii, para ii. This patient had a labor of eight hours' duration. The membranes had been ruptured two and one-half hours. The head was high, and the position was R.O.P. Pelvic measurements were normal. Pituitary extract, minims one and minims two, was given. The fetal heart subsequently dropped to 60. The uterus seemed tight. A high forceps delivery was unsuccessfully attempted through a rim of the cervix. The uterus seemed to relax under the influence of the anesthetic so a version was performed. "The head popped outside the uterus as the feet were being pulled down." Attempts at delivery from below were then discontinued and a laparotomy performed. In the interim, there was little vaginal bleeding. A stillborn infant was extracted by the abdominal route. There was a large rent in the anterior wall of the lower uterine segment at its junction with the cervix. The bladder was torn loose from its attachment to the uterus but was not ruptured. The rent was sutured in three layers and drains were placed in the posterior culdesac. She was given 500 c.c. of citrated blood. The convalescence was afebrile.

CASE 10.—(Hospital No. 36228.) 1926. Mrs. S., aged thirty years, gravida vii, para v. This patient in the thirty-sixth week was delivered normally of a stillborn, macerated fetus. The placenta had not separated three and one-half hours after delivery. The anterior lip of the cervix was torn transversely during manual extraction of the placenta, so that the operator's hand could be inserted into the anterior culdesac. The anterior uterine wall and intestine were palpated. The placenta was subsequently successfully extracted. The patient was then transferred to the hospital. The rupture was treated by suture of the cervix from below, followed by a supravaginal hysterectomy. Vaginal drainage was instituted. She made a satisfactory convalescence and was discharged in seventeen days.

CASE 11.—(Hospital No. 42337.) 1929. Mrs. J., aged forty-three years, gravida ix, para viii. There was a history of seven normal deliveries. This patient was admitted to the hospital at term, as an emergency case, with painless vaginal bleeding. Pelvic exploration revealed a partial placenta previa. The cervix easily admitted two fingers. The baby was presenting by the vertex, and the fetal heart tones were not made out. A Braxton Hicks version was performed. "With considerable traction, the baby was delivered, dead and macerated, in twenty minutes." The patient bled profusely from a laceration of the right side of the cervix, extending out into the broad ligament. The laceration was sutured from below. She received four transfusions subsequent to delivery, because of hemorrhage and shock, but died on the fourth postpartum day of peritonitis.

hypo- and hyperplasia of the pituitary gland are accompanied by hypo- and hyperplasia of the suprarenal cortex and that anencephalic fetuses show hypoplasia of the suprarenal cortex.

It is probable that under the influence of increased activity of the pituitary gland, which occurs early in pregnancy, there is a stimulation of cholesterol metabolism to care for the needs of the rapidly growing fetus. There is likewise some stimulation of thyroid activity in pregnancy, which would tend to lower the blood cholesterol, but this is evidently not sufficient to prevent the occurrence of hypercholesteremia. However, in hypothyroid states the cholesterol value is markedly increased. By way of speculation, it is possible, therefore, through overactivity of the pituitary and underactivity of the thyroid, that in certain pregnant patients, an overmobilization of cholesterol may take place. It may also be increased by an overingestion of cholesterol-containing foods.

McMeans¹² states that if hypercholesteremia reaches a certain degree, there results a secretion of an excess of cholesterol in the bile predisposing to gallstones, and a storage of cholesterol in the entire reticuloendothelial system, but principally in the liver and suprarenal cortex, corpus luteum and to some extent in the spleen.

He states that the intima of the aorta and pulmonary artery, as well as the endothelium of the smaller arteries and arterioles in rabbits, shows proliferation of the lining cells and storage of cholesterol following cholesterol feeding. Rothschild found that the liver seemed to play a very important part in preventing excessive hypercholesteremia, by secreting an increased amount of cholesterol in the bile. According to Aschoff and Landau, the endothelial tissue of the spleen, lymph nodes, and bone marrow, together with the adrenal and Kupfer cells of the liver, constitute an important intermediary apparatus in cholesterol metabolism. To quote McMeans, "as the amount of cholesterol gradually increases within the body, the demand for greater assistance in caring for the material becomes imperative. The liver and adrenals comprise the most important organs first called on. When the work becomes too heavy for them, they are assisted by the corpora lutea, the spleen and the endothelium of the blood vessels." Pierce, McNee and Grignaut observed a marked increase of cholesterol in the bile during the hypercholesteremia of pregnancy.

According to Slemons and Stander,¹³ the fats and lipoids in the blood are approximately 900 mg. per 100 c.c. during the latter part of pregnancy, a value which is approximately one-third greater than normal. This may be of significance in the metabolism of cholesterol, the solubility and absorption of which is facilitated by combination with fat. They estimate the total cholesterol in the maternal blood as 200 to 250 mg., half of which is free and the other half cholesterol esters. The total cholesterol in the fetal blood varies from 120 to 200 mg., nearly all of which is free cholesterol, as the cholesterol esters do not seem to be able to pass through the placenta. Chauffard found the cholesterol in the blood of the umbilical vein much higher than in that from the umbilical arteries, which apparently indicates that the fetus obtains cholesterol from the mother.

Klotz¹⁴ studied the vascular changes induced by the intravenous injection of 0.5 to 2 c.c. of 1-15 cholesterol in oleic acid two to three times a week into young rabbits at intervals of six days to three months. During the first few weeks the fat alone was visible in the capillaries or in the vacuoles of large phagocytic cells. Later the cholesterol crystals separated from the oil globules and became embedded in the large foreign body phagocytes around which developed a marked proliferative

obese; the abdomen was markedly pendulous. After twelve hours of labor, the cervix became fully dilated. The baby's head, however, did not descend into the pelvic excavation, even after rupture of the membranes. Two minims of pituitary extract were administered intramuscularly in an attempt to get the head into the pelvis. A prolonged severe contraction of the uterus resulted which did not relax until the patient was placed under full anesthesia. The patient's general condition was poor, as evidenced by cyanosis and a pulse rate of 150. Vaginal examination disclosed the baby's head above the brim. The umbilical cord was not pulsating. Craniotomy was attempted but the cranioclast continually slipped off the skull. Internal podalic version and breech extraction seemed to give no particular difficulty. Intrauterine examination revealed a complete transverse tear in the anterior wall of the lower segment. A transfusion was given and hysterectomy was performed. A gauze drain was placed down to the cervical stump. Vaginal drains also were inserted. The puerperium was febrile due to cystitis and an infection of the abdominal wound. She was discharged on the twenty-seventh postpartum day.

CASE 16.—(Hospital No. 13341.) 1934. Mrs. O'T., aged thirty-three years, gravida vii, para iii, was admitted in the fifth month of the pregnancy for uterine bleeding of seven weeks' duration. The diagnosis was inevitable miscarriage. A No. 3 Voorhees' bag was inserted through the cervix, but labor did not ensue, even after the administration of pituitary extract in graduated doses. Twenty-four hours later the fetus was forcibly extracted through a cervix that was dilated only enough to admit two fingers. Examination of the cervix disclosed a laceration extending out into the broad ligament. The patient's pulse quickly rose to 136. Uterine tamponade controlled all bleeding until transfusion and hysterectomy could be performed. The convalescence was complicated by acute local peritonitis and an infected abdominal wound. She received a second transfusion on the seventh day, and was discharged from the hospital on the twenty-ninth day.

CASE 17.—(Unit History No. 6950.) 1934. Mrs. P., aged thirty-four years, gravida vii, para vi, was admitted at term with a transverse presentation. The membranes ruptured at full dilatation of the cervix, following which an arm prolapsed. Internal podalic version was not difficult, but the extraction was complicated by a nuchal position of both arms. There was steady vaginal bleeding after expression of the placenta. Examination of the cervix showed a tear extending out into the right broad ligament. A supravaginal hysterectomy was performed and one transfusion given. The puerperium was afebrile.

TABLE V. PREDISPOSING CAUSES IN 9 CASES OF SPONTANEOUS RUPTURE

ETIOLOGIC FACTOR		PERIOD OF GESTATION
Previous cesarean section	5	Thirty-second to thirty-sixth weeks
Previous rupture	1	Thirty-sixth week
Pregnancy in a horn	1	Sixth month
Pressure necrosis and abruptio placentae	1	Term
Abortifacient (oil of tansy)	1	Thirty-fourth week

Case 20 demonstrated at repeated cesarean section an incomplete rupture, two inches in length, in the scar of the previous operation. The incision was extended to include the rupture. After extraction of the fetus and placenta, the edges of the rupture were freshened and sutured. This patient returned two years later when, at repeated cesarean section, a complete rupture of the scar was found (Case 22). Five of the ruptured cesarean scars were in the fundus and all ruptured four to six weeks before term, presumably as a result of weakness of the scar which gave way because of overdistention of the organ. There was a single case of rupture of a lower seg-

erate elevation of blood pressure and albuminuria, and in all but one case, fundus examination showed arterial spasms. The placentas showed one or more small to medium-sized dark to brown red acute infarcts, except in one case in which the examination was apparently negative.

There were twelve normal patients, all of whom were white and private patients. The cholesterol values in these cases varied from 154 mg. to 216 mg., the average value being 191 mg. The placentas showed no infarcts of the acute or subacute type. The cholesterol values in all the white patients, both mild preeclamptic patients and normal cases, were later discovered to be about 20 per cent too low, due to an error in the standard used in the test. The fact remains, however, that in practically all cases, the cholesterol values in pregnancy are much higher than normal, but that the degree of hypercholesteremia does not necessarily indicate the measure of susceptibility to vascular change and toxemia.

A study of the placental vessels from the above cases, and also a review of numerous slides from placental tissues previously studied, showed that cholesterol changes in the vessel wall occurred mainly in the arteries of the medium-sized villous stems, less frequently in the large arteries of the main stems, and very seldom in the vessels or capillaries of the terminal villi. It was also apparent that the characteristic change occurred only here and there in certain vessels and that the majority of the arteries were not affected. The cholesterol-like changes in the placental arteries are well shown in Figs. 1 and 2 and are seen to be of the same character as those found in human coronary thrombosis (Fig. 3) and in the artificially produced cholesterol changes in the coronaries of rabbits (Fig. 4).

There was no change in the veins comparable to that seen in the arteries as localized collections of lipid cells, but in some veins, scattered lipid cells were seen in the media or beneath the endothelium. Furthermore, the impression seemed justified that the frequency and degree of the cholesterol vascular change were more marked in eclamptic, preeclamptic, and abruptio patients and less marked in the mild toxemic and normal patients. Further study will be necessary to settle this point. Especial interest centered upon the possible finding of cholesterol crystals in areas where the vessel wall showed cholesterol change with some disintegration, but it could not be determined whether certain suggestive outlines were artifacts or crystals.

Close examination of the lining of the vessel at the site of the lesion indicated that the endothelial cells had apparently preserved a normal intact flattened layer, beneath which the subendothelial cells had proliferated, enlarged, and become lipid in character. In some arteries, extravasation of red blood cells had occurred into the vessel wall, due to a break in the lining of the vessel. *The distortion and narrowing of the lumen and the tendency to roughening and breaking down of the*

Histologic studies revealed some degree of connective and elastic tissue change, but not to any remarkable extent.

CASE 20.—(Hospital No. 30854.) 1923. Mrs. H., aged thirty-five years, gravida ii, para ii, was admitted four weeks before term in active labor of three hours' duration. She had had a classical cesarean in 1922 after being in labor four days. The convalescence was unknown. On entry the uterus was relaxing well between contractions and was not tender. A repeat cesarean section was performed. On opening the peritoneum a blood clot was observed on the surface of the uterus, beneath which was a rupture two inches long in the old scar. The uterine incision was made to extend into this rupture, and was sutured in three layers after extraction of the baby and placenta. The patient had an afebrile convalescence, but she developed a puerperal psychosis.

(This patient was readmitted two years later with a rupture of the scar. See Case 22.)

CASE 21.—(Hospital No. 35364.) 1926. Mrs. V., aged twenty-five years, gravida v, para v, was admitted fourteen hours after the onset of severe abdominal pain which came on during an automobile ride. She had had two normal deliveries and two breech deliveries. She was now six months pregnant. She was in marked shock on entry, the temperature was 101.4°, and the pulse was 140. The abdomen was doughy, generally tender, and somewhat distended. A diagnosis of concealed hemorrhage was made. It was discovered at laparotomy that the top of the left horn of the bicornuate uterus was "blown off." The baby and placenta were lying free in the opening. The left cornu, fallopian tube, and ovary were excised. She was transfused with 600 c.c. of citrated blood. She vomited continuously for several days after operation. There was marked suppression of urine. The nonprotein nitrogen rose to 218 mg. per 100 c.c. of blood, and the blood urea nitrogen went to 128 mg. Fluids were forced and ten days later the nonprotein nitrogen was 48 mg. She then made an afebrile convalescence.

CASE 22.—(Hospital No. 34492.) 1925. Mrs. H., aged thirty-seven years, gravida iii, para iii (see Case 20). This patient was admitted at the thirty-sixth week of pregnancy in active labor of four hours' duration. The uterus was relaxing well between contractions which were coming at two-minute intervals. Because she had had a spontaneous rupture of the scar in her last pregnancy, a repeat cesarean section was performed. On opening the peritoneum, 500 c.c. of blood and clots were scooped out. The uterine scar was completely separated, exposing the placenta which was in part attached to the scar. The baby weighed 5 pounds and 15 ounces and made a good recovery. A supravaginal hysterectomy was performed. Blood transfusion was not deemed necessary in view of the patient's good general condition. She again developed a puerperal psychosis, but quickly recovered, and was discharged with the baby, on the seventeenth day postpartum, after having made an afebrile convalescence.

CASE 23.—(Hospital No. 36586.) 1926. Mrs. P., aged forty-four years, gravida xii, para xii. A cesarean section was performed in 1918 for toxic separation of the placenta, following which the patient was very sick. She was admitted eight years later with severe toxemia, the onset of which was in the seventh month. Interruption of pregnancy was advised, but she refused. She was admitted to the hospital one month later in shock and was pulseless, following the onset of severe, persistent abdominal pain. The abdomen seemed full of fluid. A transfusion was given. A complete rupture of the old scar was found at laparotomy, and the baby was free in the peritoneal cavity. A supravaginal hysterectomy was performed and another transfusion given. The temperature was 102° on the second day, but soon came to normal. She made a good convalescence.

In a recent article Priscilla White¹⁹ states: "The background of diabetes appears favorable to the development of toxemia and eclampsia, the incidence of eclampsia being 5 per cent, compared with an average of 0.3 per cent in a non-diabetic series. The demonstration of excessive prolan in the urine and blood of patients with toxemia (by Smith and Smith) and the excess of toxemias and eclampsias in our own series of cases, gives us a new lead in the search for the lethal factor active the last four weeks of diabetic pregnancies."

The probable interpretation of these facts is that the hypercholesteremia in diabetic patients produces excessive cholesterol changes in the placental arteries which are thereby made more susceptible to thrombosis, occurring spontaneously or secondary to the trauma of fetal movements on the exposed placental arteries. Placental infarction, autolysis, and toxemia, therefore, occur more frequently and extensively in diabetic patients, and the increased prolan in toxemia is probably due to overstimulation of the pituitary resulting from a pathologic amount of necrosis in the placenta. The increased incidence of stillbirths among diabetic patients is more likely the result of decreased caliber or obliteration of the placental arteries from fibrous change following cholesterol changes rather than from a possible toxic effect of the increased amount of prolan. Calcification of the placenta is generally marked in these cases as might be anticipated in tissues of low vitality following atheromatous and fibrous change. It is very probable that unexplained cases of fetal death at or beyond term, in the absence of recognized syphilis, diabetes, or kidney disease, are due to the effect of hypercholesteremia on the placental vessels.

It is the belief of one of us (R. A. B.) that nausea and vomiting of pregnancy may be related to an increased secretion of cholesterol in the bile early in pregnancy until storage of the excess of this substance can take place throughout the body. In a communication from Flipse,²¹ he states that the administration of cholesterol and iron in the treatment of patients for anemia is often interfered with by the nausea which is produced. According to experimental work, this storage of cholesterol takes place first in the liver, then in the adrenals, corpus luteum, spleen, and finally in the entire reticuloendothelial system, being most marked in the arteries of the lungs and kidneys. If the liver is forced to store an excessive amount of cholesterol, excessive fatty change occurs in the peripheral portion of the lobule, followed by central necrosis and disintegration of the liver cells of the inner zone, which are the most typical changes seen in fatal cases of pernicious nausea and vomiting of pregnancy. The section of liver shown in Fig. 5 was obtained from a patient who died from pernicious nausea and vomiting during the fourth month of pregnancy. Sufficient work has not been done, as yet, on this type of toxemia to verify this hypothesis.

On this basis, the authors' conception of the toxemias of pregnancy is that of a series of toxic manifestations, fundamentally due to the hypercholesteremia of pregnancy. The sequence of events is probably

of atelectasis four hours later. The mother had a temperature of 101° on the first day after operation. She had a satisfactory convalescence, however, and was discharged on the twenty-sixth day with the abdominal wound well healed and a normally functioning bladder.

There were 11 deaths, a mortality of 42.3 per cent. Death was due to shock and hemorrhage, or sepsis. All of the patients with rupture of a cesarean scar survived. The time interval between rupture and the institution of treatment, and the type of treatment are important factors influencing mortality.

TABLE VII. TREATMENT AND TIME INTERVAL AFTER RUPTURE

		LIVED	DIED
<i>Traumatic Ruptures:</i>		8	9
Hysterectomy	40 hours after rupture		1
Hysterectomy	28 hours after rupture		1
Hysterectomy within	4 hours of rupture	7	
Suture and laparotomy	3 hours after rupture	1	
Suture of cervix and vaginal vault			3
Unrecognized			2
Uterine tamponade			2
<i>Spontaneous Ruptures:</i>		7	2
Hysterectomy within	4 hours	4	
Hysterectomy after	12 hours	1	
Suture and laparotomy	3 hours after rupture	1	
Excision left cornua		1	
Hysterectomy	60 hours after rupture		1
Unrecognized			1

Transfusion combats blood loss and shock at the same time and should be used freely.

TABLE VIII. RECORD OF TRANSFUSION

NO. OF TRANSFUSIONS	LIVED	DIED
0	4	8
1	9	1 (Unrecognized rupture)
2	2	1 (Unrecognized rupture)
4		1

The outlook for the baby is distinctly bad. Only five were discharged well, a mortality of 82 per cent.

TABLE IX. CONDITION OF BABY AT BEGINNING OF DELIVERY IN TRAUMATIC RUPTURE

CONDITION	NUMBER
Dead	7
Poor	5
Good	3
Nonviable	2

CONCLUSIONS

1. Twenty-six cases of rupture of the uterus have been reported in 47,554 deliveries at the Boston Lying-In Hospital, an incidence of 1 in 1,829.

nancy even in otherwise normal patients, is probably based upon an excessive degree of fatty change in the outer zone of the liver lobules, which tends to obstruct the fine bile capillaries and ducts.

A satisfactory classification of the toxemias of pregnancy has hitherto been impossible on account of uncertainty as to the nature or source of the poisons. On the basis of our conception of the effects produced by hypercholesteremia at the various stages of pregnancy, the following classification of the toxemias of pregnancy is proposed:

TOXEMIAS OF PREGNANCY

(Fundamentally due to hypercholesteremia of pregnancy)

A. First Half of Pregnancy:

- (1) Normal nausea and vomiting of pregnancy:
(Probably due to excessive cholesterol secretion through the bile.)
- (2) Pernicious nausea and vomiting of pregnancy:
(Probably due to excessive secretion of cholesterol through the bile plus excessive storage of cholesterol in the liver, producing fatty change and necrosis in the lobules.)

B. Second Half of Pregnancy:

- (3) Preeclampsia:
(Due to placental infarction and autolysis, induced by spontaneous or traumatic thrombosis or rupture in placental artery, predisposed to by cholesterol-induced vascular change.)
- (4) Eclampsia:
(End-result of 3, dependent on the rapidity and mass of infarction; guanidine effect probably predominating. Infarct usually situated in substance of placenta and of dark to brown red color.)
- (5) Abruptio placentae:
(End-results of 3, dependent on rapidity and mass of infarction; histamine effect probably predominating. Infarct usually situated on surface and of brown or brick-red color.)

The so-called nephritic toxemia is not included in the above classification, inasmuch as it is not, per se, a true pregnancy toxemia, but may predispose to or be associated with preeclampsia, eclampsia, and abruptio placentae through an increased tendency to hypercholesteremia. Likewise the so-called "low reserve kidney" is not included since the various degrees of mild or temporary albuminuria or hypertension are due either to the infarction's being subacute or chronic or to the fact that there is a very limited amount of tissue involved.

While the above theory of the etiology of toxemia, as applied to the first half of pregnancy, is admittedly hypothetical, it is supported by very suggestive evidence and is proposed as a promising line of investigation for further research. When applied to the latter half of pregnancy, it furnishes a basis for the clinical and pathologic manifestations and explains many hitherto puzzling facts. To one who will routinely prepare and examine placentas, there will be impressed upon

Of late years the conviction has grown that eclampsia and its precursor, preeclampsia, is not a disease primarily of the liver, or of the kidneys, or indeed of any individual organ, but an affection of all the small terminal arterioles. This concept was first advanced by Vollhard¹ in 1918, and has been accepted by Hynemann,² Hinselmann,³ and Fahr.⁴ Moreover, the term, toxemia, is now regarded as of poor descriptive value since no toxin has been isolated in eclampsia, nor is the blood of eclamptic patients more poisonous than that of other pregnant women. The word toxemia has long been used to explain the manifestation of a disease the nature of which we did not understand.

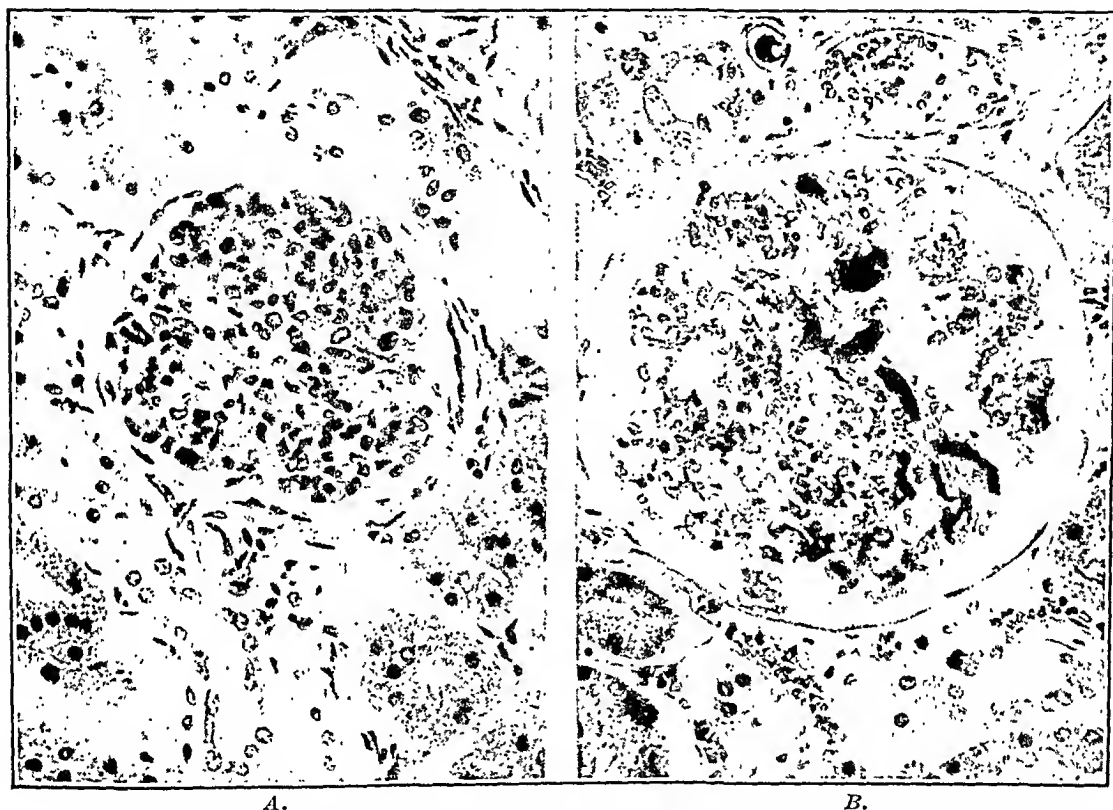


Fig. 1.—*A*, Glomerulus from normal kidney. *B*, Glomerulus from eclamptic kidney. Note in the eclamptic glomerulus the increased size, the ischemia and the presence of hyaline thrombi.

What evidence is there today that arteriolar derangement is the common factor in eclampsia? Pathologic changes bear witness and clinical investigations are constantly adding evidence. The organs most often and most actively affected are the kidneys. No case of ours which has come to autopsy has failed to show renal damage of a striking nature and consistent with our expectations, since most of the clinical manifestations of eclampsia indicate an immediate renal background.

As long ago as 1880 Cohnheim⁵ suggested that albuminuria and oliguria might result from spasm of the renal arteries. It was not until 1924, however, that Fahr⁴ published his classical description of the kidneys in this disease. He found an increase in size of the glomeruli due to swelling of the capillary walls, and a relative

2. An excessive degree of hypercholesteremia of pregnancy is probably due to hyperpituitary or hypothyroid activity and is further increased by a diet high in cholesterol-containing foods.

3. Hypercholesteremia is probably the fundamental basis for the toxemias of pregnancy.

4. It probably is responsible for nausea and vomiting of pregnancy, through an increased secretion into the bile until storage of this material can take place in the reticuloendothelial system.

5. Excessive storage in the liver in the first half of pregnancy is probably the cause of excessive fatty change in the periphery of the liver lobules with subsequent central necrosis in the inner zone of the lobules, which is so consistently found in fatal cases of pernicious vomiting of pregnancy.

6. Excessive storage in the placental arteries with resulting vascular changes is the predisposing cause of infarction in the placenta.

7. Thrombosis or rupture of a placental artery, occurring either spontaneously or produced by the trauma of fetal movements is the exciting cause of acute infarction in the placenta.

8. Acute or subacute infarction in the placenta results in autolysis of the affected tissue, with the liberation of peptone, guanidine, and histamine as toxic split products of placental protein.

9. The amount and location of the infarction, the degree of vessel obstruction, and the rapidity of autolysis determine whether preeclampsia of mild or severe degree, eclampsia, or abruptio placentae will occur.

10. If hypercholesteremia is the fundamental basis for the toxemias of pregnancy, it would seem that prophylaxis should be directed toward neutralizing the effect of excessive secretion of cholesterol into the intestinal tract through the bile and preventing excessive storage of cholesterol in the endothelial system by the administration of thyroid extract or iodine and restricting the use of fats and cholesterol-containing foods during pregnancy.

REFERENCES

- (1) Bartholomew, R. A., and Kracke, R. R.: AM. J. OBST. & GYNEC. 24: 797, 1932.
- (2) Bartholomew, R. A., and Parker, F.: AM. J. OBST. & GYNEC. 27: 72, 1934.
- (3) Young, J.: J. Obst. & Gynec. Brit. Emp. 26: 1, 1914; also 34: 279, 1927.
- (4) Leary, T.: Arch. Path. 17: 453, 1934.
- (5) Hermann and Neumann: Wien. Klin. Wchnschr. 25: 1557, 1912.
- (6) Shiskin: Brit. M. J. 1: 393, 1925.
- (7) Oscar and Karr: Arch. Int. Med. 36: 507, 1925.
- (8) Ferguson and Priestley: AM. J. OBST. & GYNEC. 16: 82, 1928.
- (9) Muller, Gulli-Lindh: Medicine 9: 1939.
- (10) Mochlig, R. C., and Ainslee, H. B.: Am. J. Physiol. 80: 649, 1927.
- (11) Fluhmann, C. F.: AM. J. OBST. & GYNEC. 12: 774, 1926.
- (12) McMeans, J. W.: J. Med. Research 33: 481, 1915.
- (13) Slemons, J. M., and Stander, H. J.: Bull. Johns Hopkins Hosp. 34: 7, 1923.
- (14) Klotz, O.: J. Med. Research 33: 157, 1915.
- (15) Duff, G. L.: Arch. Path. 20: 81 and 259, 1935.
- (16) Slemons, J. M., and Curtis, C. S.: Am. J. Obst. 75: 569, 1917.
- (17) Rosenthal, F., and Patrzek: Berl. Klin. Wchnschr. 56: 793, 1919. (Cited by Gulli-Lindh Muller.)
- (18) Herrick, W. W.: Arch. Int. Med. 55: 643, 1925.
- (19) White, Priscilla: Surg. Gynec. Obst. 61: 321, 1935.
- (20) Page, I. H., and Bernhard, W. G.: Arch. Path. 19: 530, 1935.
- (21) Flipse, M. J.: Personal communication.

briefly to review Cushny's⁷ theory of urinary secretion, which at the present time is generally accepted as correct.

After the urine has passed through the capillary loops of the glomeruli into Bowman's capsules it becomes the glomerular filtrate and is identical in composition with the blood plasma except that it contains no protein. Albumin, therefore, is not a normal constituent of the glomerular filtrate. The glomerular filtrate is forced out of the glomerular loops under the direct head of the blood pressure which is about 120 mm. Hg. Opposed to this force is the osmotic pressure of the plasma proteins remaining within the blood stream and exerting another force in the opposite direction of 40 mm. Hg. The available pressure for secretion is thus 80 mm. Hg (Fig. 2). The glomerular filtrate, which amounts to the enormous amount of 100 liters daily, contains substances which are of use to the body and hence are completely or almost completely resorbed as they pass down the tubules (Fig. 3). These Cushny calls high

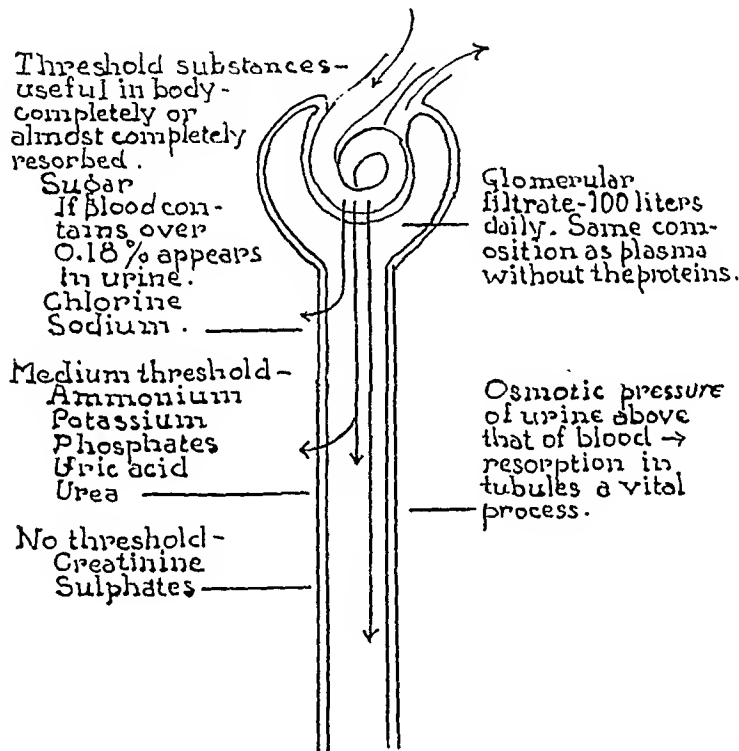


Fig. 3.—High, medium and low threshold substances.

threshold bodies and are sugar, chlorine, sodium, and bicarbonate. Sugar will be excreted if its concentration in the blood exceeds 0.18 per cent. This may be brought about if the patient is given intravenously over 2 gm. of glucose per kilo of body weight. An artificial diabetes is thus engendered, since water will pass into the glomerular filtrate to lower the increased osmotic pressure produced by the excreted sugar. This is the physiologic basis behind the intravenous use of concentrated glucose solutions to stimulate urinary secretion. Sodium, chlorine, and calcium are not completely resorbed in the tubules, but only in sufficient quantities to maintain a physiologic concentration in the blood. Ammonium, potassium, phosphates, uric acid, and urea are less completely resorbed, and are called medium threshold bodies. No threshold bodies are creatinine and sulphates, which are of no use to the individual and are completely eliminated. In grave kidney impairment creatinine is one of the last substances to accumulate in the blood. The amount of creatinine retained has some prognostic importance, since it is said that a concentration of over 5 mg. per 100 c.c. indicates recovery to be hopeless.

About half the anesthetics were administered by professional anesthetists and about half by members of the house staff. The four chloroform anesthetics were given solely for investigative purposes, but in all other cases the anesthetic was chosen which seemed best suited to the patient and was administered according to ordinary practice without reference to the contemplated blood study. Usually, indeed, the anesthetist did not know that the blood studies were to be carried out until a minute or two before the venipunctures were made. In the nitrous oxide oxygen anesthetics the relative quantities of the two gases administered during the last minute before the birth of the baby were estimated and recorded, but it is realized that these figures are approximations only. A particular effort was made to detect any maternal cyanosis occurring during the anesthesia.

Since it was desired to determine the effect of anesthesia per se upon the oxygen content of the child's blood, cases of breech extraction and difficult forceps delivery were excluded from the series in the belief that these procedures themselves might produce similar effects. Cases of birth injury or congenital defect were likewise discarded.

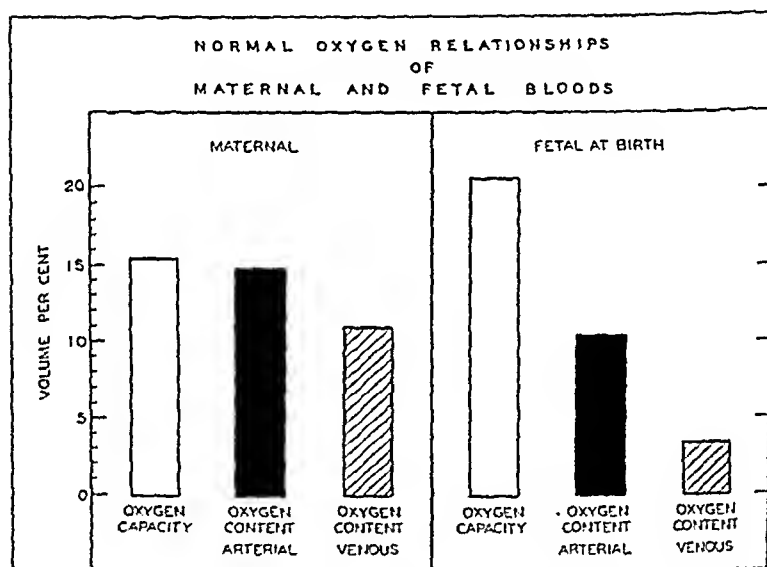


Chart 1.—Showing the average oxygen relationships of blood in fifteen normal mothers and fifteen unanesthetized infants at birth.

RESULTS

In evaluating the changes produced in fetal blood by maternal anesthesia, it is important to recall that the normal oxygen relationships of that blood differ widely from that of the adult. This is shown diagrammatically in Chart 1, which represents the average findings in fifteen mothers and in fifteen infants born without anesthesia. The contrast between the oxygen capacities of the two bloods is particularly striking, that of the full-term fetus averaging 20.8 volumes per cent and that of the mother 15.4 volumes per cent. Since the oxygen capacity of a given sample of blood is in direct proportion to its hemoglobin content, this finding simply confirms the well-known fact that blood of the newborn child is very rich in hemoglobin, whereas that of the average pregnant woman is slightly depleted of that substance. The arterial blood of the

arterioles which supply the tubules and may rupture into them. Another possible cause may be bleeding into Bowman's capsule when the spasm of the afferent arterioles is released.

The liver has surrendered to the kidney the position of prime importance which it has occupied since 1893 when Schmorl⁸ first described the lesions found in it at autopsy. His observations were corroborated by Lubarsch,⁹ Konstantanovitch,¹⁰ Ceelen,¹¹ and Fahr,⁴ who in summarizing their findings stated that the characteristic lesions were found at the periphery of the lobule and consisted of fibrin thrombi in the capillaries, hemorrhage, and necrosis of the adjacent liver cells. This was accepted for some years as the typical picture of eclampsia.

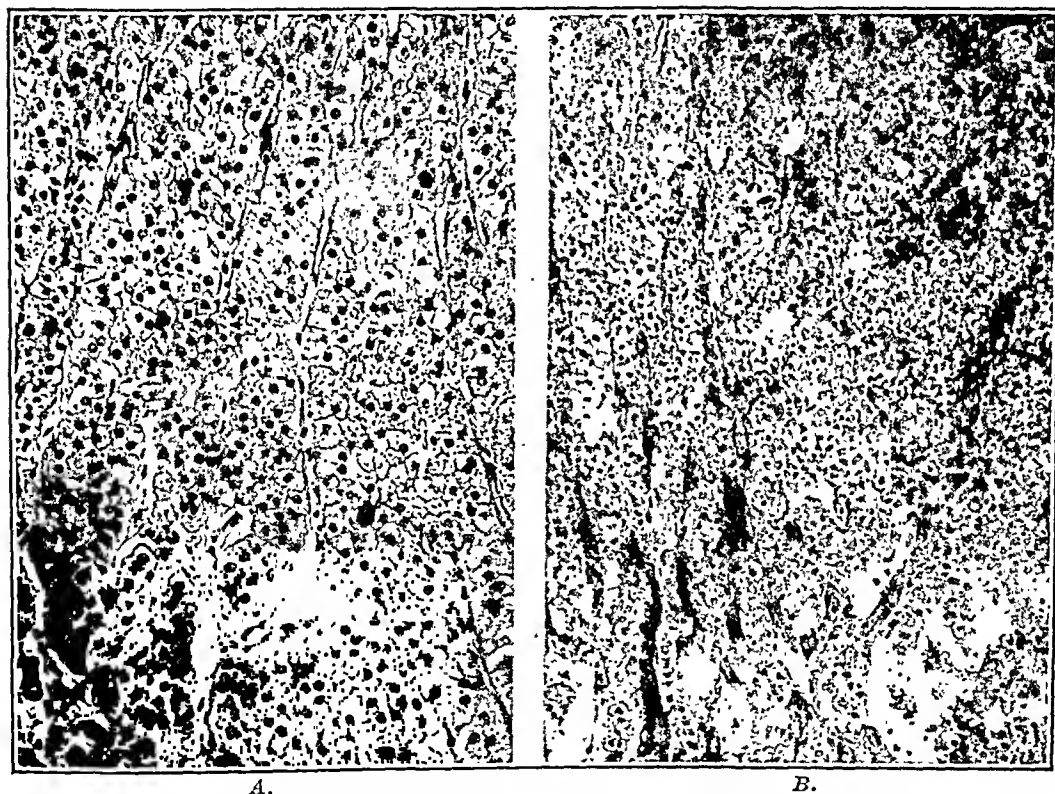


Fig. 6.—A, Cortex from normal adrenal. B, Cortex from eclamptic adrenal. Note hemorrhage, thrombosis of capillaries and destruction of normal architecture.

In 1931 Acosta-Sison¹² noted areas of hemorrhage, necrosis and fatty degeneration, usually predominant at the periphery of the lobule, but also found in the central and midzonal portion. In the same year Davidson¹³ described necrosis in the peripheral, midzonal and central areas as well as focal lesions scattered throughout the lobules. The work of our pathologic laboratory fully confirms the finding of these two recent investigators. Fatty degeneration we have noted to be least common. We can say that the liver lesions of eclampsia may consist of hemorrhage, necrosis, or fatty degeneration, that they may occur in any portion of the lobules and that one, two, or all three varieties of lesions may exist in the same individual (Fig. 4). Thromboses of the radicles of the portal vein or of the small branches of the hepatic artery occupying the portal spaces may be found, thus placing the liver lesions also upon a vascular basis (Fig. 5).

the mother to the pulmonary alveoli is not impeded by collections of mucus. And with the maternal blood well oxygenated one would not expect to find anoxemia of the fetus.

The average oxygen saturation of the fetal blood in eight cases of open ether anesthesia, all low forceps deliveries, was slightly depressed to 45 per cent in the arterial blood. The common tendency of ether to promote excessive secretion of mucus in the respiratory tract and consequent interference with the passage of air through the alveolar membranes of the mother is possibly responsible for this alteration, and in occasional cases very marked accumulations of mucus might conceivably produce greater changes. Usually, however, the diminution in the oxygen saturation of the fetal blood produced by ether is not of sufficient degree to injure the fetus through anoxemia.

CASE NO	AGE	PARITY	GAS-MIXTURE APPROX	DURATION MINUTES	MATERNAL CYANOSIS	OXYGEN SATURATION OF BLOOD				ASPHYXIA
						MOTHER		CHILD		
						ARTERIAL	VENOUS	ARTERIAL	VENOUS	
1	29	III	80 : 20	2	NONE	% 92.1	% 70.5	% 41.0	% 20.3	NONE
2	19	I	85 : 15	3	NONE	90.7	68.7	38.4	-	NONE
3	18	I	85 : 15	5	SLIGHT	76.2	50.3	25.1	16.0	NONE
4	25	II	80 : 20	2	NONE	90.6	-	51.9	26.8	NONE
5	25	II	80 : 20	2	NONE	-	-	40.5	19.9	SLIGHT
6	31	II	75 : 25	1	NONE	94.9	-	50.2	28.7	NONE
7	28	IX	75 : 25	2	NONE	-	-	51.3	30.0	NONE
8	20	I	80 : 20	4	PRESENT	68.9	45.0	29.2	18.1	SLIGHT
9	18	II	80 : 20	3	NONE	89.9	65.0	39.2	-	NONE
10	28	III	75 : 25	2	NONE	93.1	66.6	44.4	19.8	NONE
11	19	II	80 : 20	2	NONE	-	-	44.0	-	NONE
						AVERAGE		41.3		

Chart 3.—Showing the details of eleven cases in which nitrous oxide oxygen was administered for obstetric analgesia.

When we turn to the effects of nitrous oxide oxygen anesthesia upon the oxygen saturation of fetal blood, we meet more marked changes. In the eleven patients given nitrous oxide oxygen in the approximate proportions of 80:20, the actual gas mixtures received by the patient were probably somewhat higher than that shown, since the figure represents the concentrations given during the last minute of the second stage only and frequently stronger mixtures had been administered just previously. It was the desire in these cases to produce analgesia only. The twelve cases in which nitrous oxide oxygen in proportions of 90:10 was administered, comprised eight cesarean sections and four low forceps deliveries. In both these groups there was a substantial reduction in the oxygen saturation of the fetal blood, in the former the arterial saturation showing a moderate reduction to 40 per cent and in the latter group a decided decrease to 25 per cent, or one-half the normal figure. The venous blood

Blumgart and Ernstene²⁰ have shown that it may be elicited in normal subjects by immersing the arm in water at 114° F. and listening with a stethoscope over the brachial artery. The murmur should appear in five minutes. It may be obtained in practically 100 per cent of normal individuals under 40, and its presence signifies

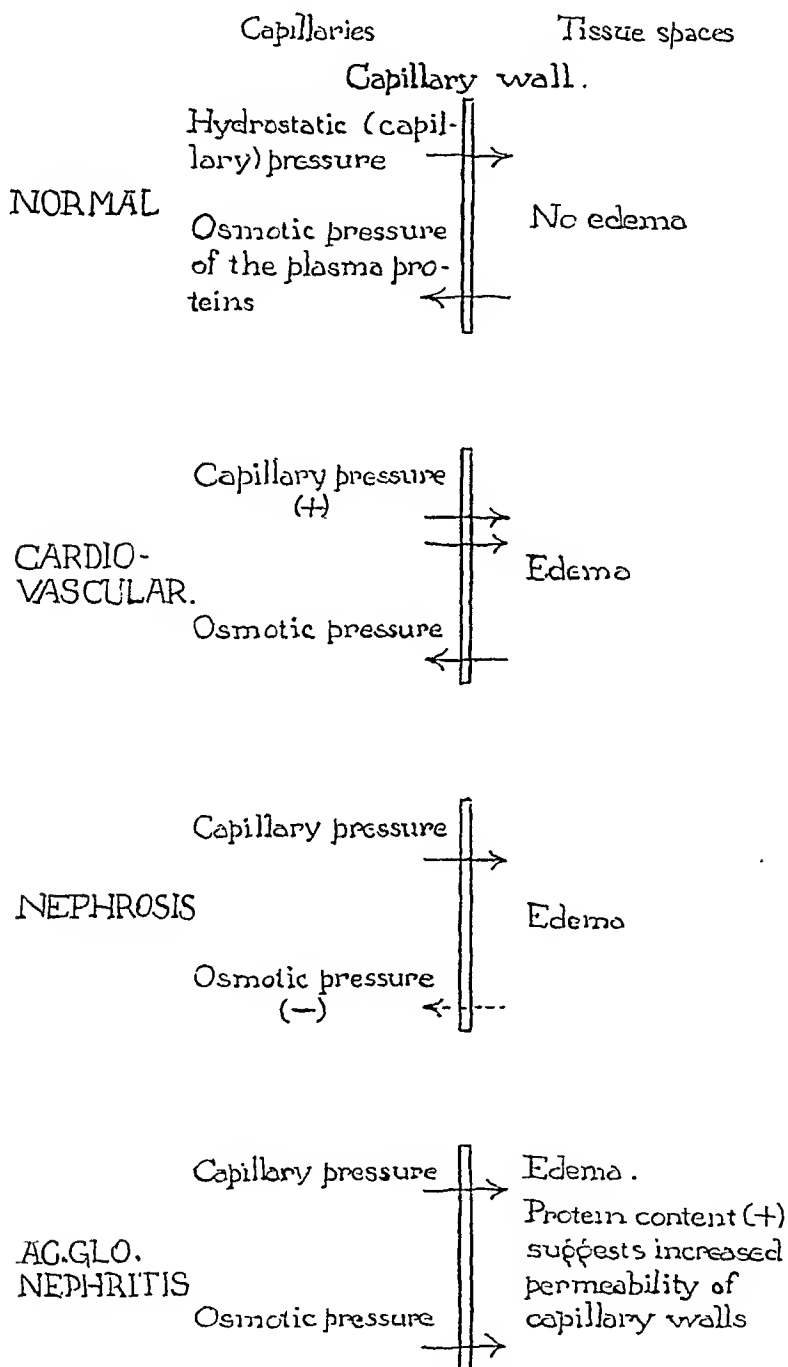


Fig. 7.—The production of edema.

the absence of arteriolar spasm or sclerosis. Alexander carried out this test to determine the arteriolar condition of 16 patients with present preeclampsia, or present or past preeclampsia or eclampsia, and found that 38 per cent failed to give Duroziez's sign, although all were in the age group where the normal expectancy of its appearance would be 100 per cent. Of 6 patients who had preeclampsia at the time and a past history of the same condition, 4 failed to give the sign. Of 7

oxygen saturation of their bloods. Thus, in Cases 2, 3, 5, and 9, the arterial bloods of the infants revealed oxygen saturations of less than 14 per cent; in three of these cases, the gas mixture given the mother was in the approximate proportion of 95:5. In four of the twelve babies in the group there were varying degrees of asphyxia, but in only one instance was it marked. Evidence will be advanced presently, however, which suggests that the low oxygen saturations met in several of these infants, particularly Cases 2 and 5, represent dangerous levels of anoxemia. As might be expected, the bloods of the mothers in this group were substantially reduced in their oxygen content and in four instances varying degrees of cyanosis were present in the last minute or two before birth. It seems of particular importance to note that the umbilical arteries, carrying venous blood from the fetus, were collapsed in most of these infants, making it impossible to secure blood. We have ob-

CASE NO.	AGE	PARITY	GAS-MIXTURE APPROX	DURATION MINUTES	MATERNAL CYANOSIS	OXYGEN SATURATION OF FETAL BLOOD AT BIRTH		ASPHYXIA
						ARTERIAL	VENOUS	
1	19	I	95 : 5	10	MARKED	% 1.5	VESSELS COLLAPSED	LOW FORCEPS HEART RATE 30 PER MINUTE DIED AFTER 15 MINUTES' ARTIFICIAL RESPIRATION
2	20	I	95 : 5	20	SLIGHT	6.0	VESSELS COLLAPSED	CESAREAN SECTION HEART RATE 28 PER MINUTE. DIED AFTER 25 MINUTES' ARTIFICIAL RESPIRATION
3	24	II	90 : 10	15	NONE	8.4	VESSELS COLLAPSED	LOW FORCEPS APNEA 20 MINUTES
4	17	I	95 : 5	20	SLIGHT	7.3	VESSELS COLLAPSED	LOW FORCEPS APNEA 15 MINUTES
5	30	III	95 : 5	18	SLIGHT	10.4	VESSELS COLLAPSED	LOW FORCEPS APNEA 15 MINUTES

Chart 5.—Showing the details of five cases of profound asphyxia neonatorum in which concentrated mixtures of nitrous oxide oxygen had been administered to the mothers.

served this collapsed state of the umbilical arteries again and again in cases of marked fetal anoxemia and regard it as rather a constant characteristic. Presumably it is due to a fall in the arterial blood pressure of the infant in connection with the anoxemia.

But the question remains to be answered whether nitrous oxide oxygen anesthesia ever produces really profound, or actually fatal asphyxia neonatorum. It was hardly to be expected in prearranged studies such as this that we would encounter a case showing such a relationship. Accordingly, this scheme of attack was planned. The clamped umbilical cords of all babies born by operation under nitrous oxide oxygen anesthesia were momentarily saved, previous experiments indicating that the fetal blood showed no appreciable changes under such circumstances. If the baby breathed at once or after a few minutes, the cords were dis-

stimulate the vasoconstrictor fibers may be expected to cause contraction of the terminal arterioles. No such substance has been identified ✓ in eclampsia.

The same effect might be produced by the direct action of some substance, such as pituitary extract, upon the vessel walls.

In 1931 Anselmino and Hoffmann²⁷ prepared an ultrafiltrate from the blood of eclamptic and preeclamptic women and injected it into rabbits with known diuresis curves. They found that it would cause anuria, retention of chlorides, and an elevation of blood pressure, while an ultrafiltrate prepared in the same way from the blood of normal pregnant women would produce no such effect. Similar results could be obtained by the injection of pituitary extract. Moreover, Anselmino and Hoffmann stated that their ultrafiltrate resembled pituitary extract, in that it was rendered inert by exposure to ultraviolet light and alkalization and was absorbed by talcum. They reasoned that the toxic agent in eclampsia might be pituitary extract, since it produced evidences similar to their material obtained from women suffering from the disease. Unfortunately, the findings of Anselmino and Hoffmann have not been confirmed by other investigators. Hurwitz and Bullock,²⁸ in our clinic, have repeated the experiments and have obtained entirely negative results with the ultrafiltrate. The results with pituitary extract, already well known to physiologists and pharmacologists, can, of course, be duplicated with ease.

Certain general conclusions may be drawn from a study of the pathology and pathologic physiology in preeclampsia and eclampsia.

1. There is considerable evidence that the disease is vascular in nature and may best be explained on the basis of arteriolar spasm.

2. Hypertension is probably a protective mechanism. Any measures which are directed solely toward a reduction of blood pressure are productive of little benefit.

3. Edema may cause considerable harm and active steps should be taken to bring about its removal. Free watery catharsis, produced by large oral doses of magnesium sulphate, is an effective method of reducing anasarea. Diuretics acting directly on the glomerular endo- and epithelium are contraindicated, since on account of the nature of the kidney lesion they cannot be employed on a rational basis. The intravenous use of concentrated glucose solution is sometimes useful in stimulating kidney secretion when recovery is under way, but it is often of little benefit in the presence of complete, or almost complete, urinary suppression.

4. The best treatment for eclampsia is prophylaxis. For this reason each case of preeclampsia should be carefully studied from the aspect of abnormal physiology and delivery effected when improvement under treatment fails to take place.

REFERENCES

- (1) Volhard: Die Doppelseitigen Haematogenen Nierenkrankungen, Berlin, 1918.
 (2) Heynemann: Die Eklampsie, Bonn, 1924. (3) Hinselmann: Die Eklampsie, Bonn, 1924. (4) Fahr: Die Eklampsie, Bonn, 1924. (5) Cohnheim: Vorlesungen über Allgemeine Pathologie 2: 1880. (6) Bell: Am. J. Path. 8: 1, 1932. (7) Cushny: Secretion of Urine, ed. 2, London, 1926. (8) Schmorl: Pathol-Anatomische

as follows: To mild degrees of anoxemia the body reacts by increased respiration and accelerated heart rate; these presumably are compensatory mechanisms, the first designed to bring more oxygen to the blood and the second to deliver more oxygen to the tissues. With increasing anoxemia a point is reached when these compensatory mechanisms fail to supply oxygen in amounts sufficient for cellular oxidation and then with dramatic suddenness, "the oxygen crisis" of the physiologists, or what is termed "the reversal" by Schmidt,⁹ takes place and after this, events occur rapidly. Consciousness is lost and respirations stop. Following respiratory failure there is an interval of from three to five minutes during which the heart continues to beat; but there is a marked slowing of the rate. In a typical case the slowing occurs by abrupt steps from 156 per minute before the crisis to 44 per minute in the post-crisis phase. Electrocardiographic studies of the heart at this stage show suppression of the pace-making function of the sinoauricular node and the assumption of that function by the auriculoventricular node with its characteristic slow and regular rate. There is regularly partial or complete heart block with decrease in conduction in the internodal region to the point of suppression. Since this slowing of the heart in anoxemia does not occur in animals with the vagi cut, it is apparently due to vago-spasm, which suppresses the sinoauricular rhythm. After respirations cease, sometimes a little earlier, the blood pressure slowly declines through forty to sixty seconds. It then may show a slight increase, but finally falls rapidly through two to three minutes, then more slowly for one or two minutes until a systolic pressure of 15 to 20 mm. Hg is reached. Concomitant with the drop in blood pressure the skin becomes blanched and cold, as in shock. Early in the post-crisis phase of experimental anoxemia another important change occurs: the nerve muscle endings of skeletal muscle cease to function, with complete collapse of that muscular system. Finally, it may be noted that a few whiffs of oxygen or air, administered by artificial respiration, restores the animal at once to normal provided this is done within three or four minutes following the oxygen crisis. To summarize the picture of experimental anoxemia in the post-crisis phase, there occur in rapid succession loss of consciousness, cessation of respiration, marked slowing of the heart, fall in blood pressure with the white, cold skin of shock and skeletal muscle collapse. Surely, few clinical conditions can be simulated so completely as can asphyxia neonatorum by experimental anoxemia.

Since the time of Ahfeld¹⁰ it has been generally believed that the thoracic wall and diaphragm of the fetus make shallow, rhythmic excursions throughout the latter part of intrauterine life. Two of my associates, Dr. F. F. Snyder of the Department of Obstetrics and Dr. Morris Rosenfeld of the Department of Pharmacology and Experimental Therapeutics, are now engaged in an experimental study of this phenomenon in rabbits. By means of an ingenious technic, they are able to

In 1929 McPheeters expressed his opinion in favor of injection treatment and in 1931 reported 46 cases successfully treated. He considers varices of pregnancy, when they are painful or distressing due to large size, as particularly suitable for injection. It is true that most of these patients will have their condition relieved partially or completely following confinement. But he asks whether it is logical to expect a woman to suffer from three to five months with a condition which can be relieved with so little difficulty and at such comparatively slight risk. He arbitrarily chooses the sixth month as the latest limit for the treatment.

Noble, of Vienna, believes that obliteration treatment of varicose veins may be resorted to in the first half of pregnancy, but should be avoided in the second half, not only because of extreme dilatation of the vessels, but also because of hormonal changes in the coagulability of the blood. In our series the treatment was not restricted in relation to the duration of gestation, and the greater number of our patients were treated after the sixth month.

The question of etiology of varicose veins in pregnancy is not as yet definitely settled. There are numerous theories offered by different investigators, none of which appear wholly acceptable. There always was a notion among obstetricians that the varicosities are caused by the pressure of the enlarged uterus on the external iliac veins, thus causing obstruction to the venous flow. Lohr and Kownatski believed that the varicosities are not due to the increasing size of the uterus and pressure by it on the veins, but to the dilatation of genital collecting veins and as a result a great increase in the compensatory back pressure in the external iliac and saphenous veins. This theory explains very well the varicosities of the latter months of pregnancy but not of the early ones. For certainly in the second and third months of pregnancy there is not a great increase in the blood volume and the size of the uterus and yet in many instances the varicosities are already pronounced at that early period of gestation.

Generalized loss of tonicity of the smooth muscles during pregnancy offers some physiologic explanation for this phenomenon. The investigation of Gellhorn and Alvarez fully support this theory. Evidence of the close relationship of the endocrine system to the development of varicose veins in pregnancy is presented by a number of investigators. Forestier firmly believes that the insufficiency of the posterior pituitary secretion is responsible. Professor Siekard considers three endocrine and ovarian periods in a woman's life: first, prepubertal; second, from puberty to menopause; and third, the rest of her life. The interruption of her endocrine balance by pregnancy may influence the formation of varices. But if Siekard's theory is correct, asks McPheeters, why should we not have rapidly developing and extensive cases of varicose veins following hysterectomies and ovariectomies, conditions which seldom actu-

such cases, we prefer ether on an open mask to insure liberal oxygenation of the child's blood. The same is true of breech extractions in which there is an inherent tendency to fetal anoxemia due to the impingement of the child's shoulders and head on the umbilical cord.

In sum, we hold to the belief that asphyxia neonatorum, in all of its manifestations, is an example of profound oxygen want. For this reason the one urgent necessity in its treatment is oxygen, and by the same token, the one urgent requirement in its prevention is oxygen.

CONCLUSIONS

1. Chloroform anesthesia, when administered to mothers at the time of delivery, has no demonstrable effect on the oxygen saturation of fetal blood, but due to its toxic effects on the mother, it is not to be recommended as an obstetric anesthetic.

2. Ether anesthesia produces a slight depression of the oxygen saturation of fetal blood, but this is not of sufficient degree to injure the fetus through anoxemia.

3. Nitrous oxide oxygen mixtures, administered to mothers in proportions of 85:15 or weaker, and for periods of less than five minutes, regularly cause moderate degrees of fetal anoxemia but the normal, full-term infant is apparently not harmed.

4. When nitrous oxide oxygen is given in concentrations of 90:10 or stronger over periods which exceed five minutes, marked degrees of fetal anoxemia are produced in about one baby out of three and occasionally profound asphyxia neonatorum results.

REFERENCES

- (1) *Leake, C. D., Leake, E. W., and Koehler, A. E.*: J. Biol. Chem. 56: 319, 1923.
- (2) *Ronzoni, Ethel, Koechig, I., and Eaton, E. P.*: J. Biol. Chem. 61: 465, 1924.
- (3) *Raginsky, B. B., and Bourne, W.*: J. Canad. M. A. 30: 518, 1934. (4) *Sollmann, T.*: A Manual of Pharmacology, Philadelphia, 1932, W. B. Saunders Company, p. 758. (5) *Van Slyke, D. D., and Neill, J. M.*: J. Biol. Chem. 61: 523, 1924. (6) *Klug, F.*: Arch. f. Anat. u. Physiol., Physiol. Abt., p. 394, 1883. (7) *Lewis, T., and Mathison, G. C.*: Heart 2: 47, 1910. (8) *Greene, C. W., and Gilbert, N. C.*: Arch. Int. Med. 27: 517, 1921; Am. J. Physiol. 55: 307, 1921; *ibid.* 56: 475, 1921; *ibid.* 60: 155, 1922. (9) *Schmidt, Carl F.*: Am. J. Physiol. 84: 202, 1928. (10) *Ahfeld, F.*: Monatschr. f. Geburtsh. u. Gynäk. 21: 143, 1905.

recognize that the deep system was functioning properly, and that we were dealing with true varicose veins and not with the compensatory varicosities necessary to maintain venous return.

The technic of injection was simplified to the utmost. All injections were done with the patient standing on a broad table, the height of an ordinary chair. The skin was cleaned with alcohol, as colored antiseptics mask the veins. We used 10 c.c. glass Luer syringes and 21 gauge intravenous needles with medium bevel, 1½ inch long, sterilized by boiling.

The needle should traverse first skin and connective tissue, before entering the vein. Taking this precaution a valve puncture may be obtained and the possibility of back flow extravasation of the solution reduced to the minimum. Of course, the operator should be absolutely certain that the needle is actually within the lumen of the vein and that free flow of blood appears in the syringe on withdrawing the plunger. Further, it is well to withdraw a little blood before removing the needle as it is drawn out through the tissue.

The purpose of the injection treatment is to bring the injected fluid, in as concentrated a solution as possible, into direct intimate contact with the endothelial lining of the vein. The more concentrated the solution the more destructive action it will have on the lining of the vein. In our experience the tourniquet was not necessary and was omitted altogether. The sclerosing action of the solution could be in most instances demonstrated almost immediately after the injection.

The only precaution taken after the injection was strapping by adhesive plaster with a sponge folded over the injected area. The pressure was used only for the purpose of avoiding the leakage of the highly sclerosing irritating solution. Even small amounts of the solution deposited outside the vein will invariably result in severe perivenitis and oftentimes slough.

After the injection the patient is encouraged to walk about the room, is advised against bed rest, and is urged to continue her everyday occupation and housework.

Normally almost every patient experiences cramping pain; the cramp is evidently due to the irritation of nerves in the adventitia, when the injected sclerosing solution reaches them through the wall of the vein or through capillaries.

Occasionally, even with the best of technic, the patient may move and as a result some of the solution will be deposited outside the vein. As a result the patient will immediately experience a burning sensation. In some instances we have noted that soon whitish discoloration of the skin was produced at the site of the injection. Injection should be stopped and corrective measures taken. In our experience normal salt solution injected promptly into the subcutaneous tissue around the vein in the amount of 5 to 10 c.c. neutralized the destructive action of the sclerosing solution and prevented severe reaction.

In our group of one hundred patients with a total number of 473 injections, perivenitis was encountered in only four instances, and slough resulted in only two cases.

We used almost exclusively a solution of dextrose, 50 per cent, and sodium chloride, 30 per cent, because we feared the severe reactions which may result from sodium morrhuate. Ritchie mentions three different types of such reactions:

1. Gastrointestinal disturbances with abdominal pain and diarrhea shortly after the injection.
2. Erythematous manifestations of the skin.
3. Collapse with cyanosis, pallor, low blood pressure and temporary loss of consciousness.

All of these complications, of course, would be particularly undesirable and dangerous in the pregnant individual.

On the basis of information at present available, it would seem that in the vast majority of American girls the age at first menstruation varies from ten to seventeen years, and the average has generally been found to be somewhere between thirteen and fourteen (Engelmann,² Baldwin,³ Lintz and Markow,⁴ Hotelling,⁵ Popenoe,⁶ Gould and Gould,⁷ Boas,⁸ Engle and Shelesnyak,⁹ and others). On the other hand, reports from various European countries indicate that the average age of the menarche is from fifteen to seventeen, one to two years later than in the United States.

Many students of this problem have sought to compare various series in order to determine the conditions that influence the age at which puberty appears. The multiplicity of factors concerned in such analyses provide objections which seriously impair the validity of many far-flung conclusions which have been advanced. It has, for instance, been widely maintained that *climate* has an important influence on the age of puberty, but a consideration of reports from many localities fails to produce convincing evidence. The subject deserves more careful investigation, however, and Mills¹⁰ has recently pointed out that since the European immigrant stock in the United States gradually approaches the earlier North American Indian age some factor of environment must be responsible for the change, and he believes that the element of weather variability may be important. This is also supported by the observation of Engle and Shelesnyak,⁹ who demonstrated a distinct seasonal incidence in the onset of the first menses, as only 18 per cent of the total number of subjects (American) they studied occurred during the summer months of June, July, and August.

The question of *race* has been considered by several authors, and it has been asserted that in certain localities an earlier menarche is found among Jewesses than among the Gentiles (Schaeffer,¹¹ Weissenberg,¹² Bolk¹³). The original work of Schaeffer¹¹ also suggested that *social status* may have an important bearing on the problem. He found that among the upper social strata the average age of the menarche was almost two years less than among women of the lower classes, and the probable importance of diet (Slonaker and Card¹⁴) and hygiene leads to a serious consideration of this observation. Similarly, he claimed that the figure for women living in large cities generally was less than for those from rural districts, but the studies of Engelmann² and Lintz and Markow⁴ do not point to such influences as active in this country.

An observation which seems to have been authenticated both in Europe and the United States (Bolk,¹³ Popenoe,⁶ Gould and Gould⁷) is that the daughters of the present generation have an earlier menarche than their mothers. This is particularly of interest in view of the relation of the onset of menstruation to general body growth, and the finding of Boas¹² that the stature of the children of the year 1921

Symptoms:

Pain	81
Cramp	76
Swelling	70
Excessive tire	81
Heaviness and others	44

Degree of severity, etc:

Mild	29
Moderate	56
Severe	15
Uleer	4
Phlebitis	2
Varices of vulva	11

Treatment:

<i>Reaction</i>		<i>Results</i>	
No reaction	95	Good	90
Perivenitis	4	Improved	10
Aseptic phlebitis	1		
Slough	2		

The duration of varicose veins during current pregnancies was:

1 month's duration	10 patients
2 months' duration	14 patients
3 months' duration	13 patients
4 months' duration	28 patients
5 months' duration	13 patients
6 months' duration	15 patients
7 months' duration	7 patients
Total	100 patients

The number of injections given to patients:

1 injection was given to	20 patients
2 injections were given to	15 patients
3 injections were given to	13 patients
4 injections were given to	11 patients
5 injections were given to	9 patients
6 injections were given to	8 patients
7 injections were given to	4 patients
8 injections were given to	5 patients
9 injections were given to	4 patients
10 injections were given to	2 patients
11 injections were given to	2 patients
12 injections were given to	1 patient
13 injections were given to	1 patient
14 injections were given to	3 patients
15 injections were given to	1 patient
17 injections were given to	1 patient
473 injections were given to	100 patients

As is seen from the last table, some of the patients received quite a number of injections. That was entirely due to the extensive varicosities and to the fact that only one injection at a time was given. This precaution was taken as from the experience of other surgeons; excessive chemical perivenitis was encountered following injection in patients with extensive varicosities, when too large an area was treated at one time. On an average two injections a week were given.

maximum rate of growth," not only bears a very definite relation to the first menses, but varies in intensity and time of occurrence according to the age of the menarche (Boas⁸). In a group of schoolgirls, Boas⁸ found that the average age at first menstruation was 13.1 ± 1.2 years, while the moment of the most rapid rate of growth was 12.0 ± 1.2 years. There is thus an average difference of about one year between the two ages, although this actually varies according to the early or late onset of puberty. "Maximum growth occurs between ten and eleven years for those with first menstruation between ten and twelve; between eleven and twelve for those with first menstruation between twelve and thirteen years; and between twelve and thirteen years for those with first menstruation between thirteen and seventeen" (Boas⁸).

Since the period of maximum growth precedes the first menstruation, girls at the menarche are generally taller than the average in

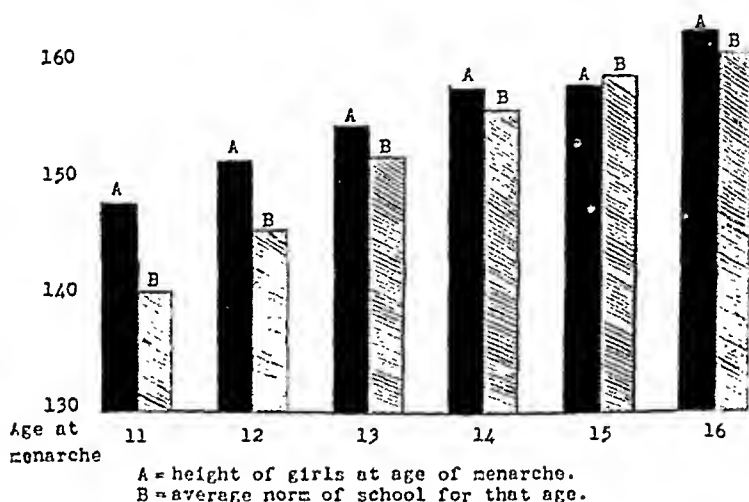


FIG. 1.

dividual of the same age. However, since the growth period is the more intense the earlier puberty sets in, this difference is much more marked in younger adolescents.

By way of illustration we have the study of 151 schoolgirls reported by Baldwin³ (Fig. 1). He found that 7 girls who first menstruated at eleven years of age had an average height of 148.2 cm., while the average or normal for the school at that age was 140.39 cm.; 25 girls with first menstruation at twelve years of age had an average height of 152.1 cm., with the average or normal for the school at 146.22 cm.; 56 girls with first menstruation at thirteen years of age had an average height of 155.3 cm. and the normal was 152.74 cm.; 42 girls with first menstruation at fourteen years of age had an average height of 159.6 cm. and the normal was 156.97 cm.; 17 girls with first menstruation at fifteen years of age were 158.5 cm. in height and the normal was 159.35 cm.; and 4 girls with first menstruation at sixteen or a comparatively late age were 163.2 cm., while the average for the group was 161.59 cm.

Following the period of maximum rate of body growth and the initiation of the menses, there is a rapid decrease in growth until it

THE HEART IN UTERINE MYOMA

MAURICE S. JACOBS, A.B., M.D., PHILADELPHIA, PA.

(From the Cardiac Clinic, Jewish Hospital)

THE present study was undertaken to determine, if possible, whether uterine fibroids produced any definite and demonstrable effect upon the cardiovascular system.

HISTORICAL

A generation or so ago, the effect was supposed to be definitely toxic; later, the cardiac changes were called "functional," and any causal relationship between cardiac degeneration and uterine fibroids was denied. More recently, the pendulum seems to be swinging back to the original idea of toxic absorption and cardiac damage.

Thus, Bandler² found organic myocardial or functional cardiac changes in 30 to 40 per cent of his cases and claimed further that fibroids "cause changes in the liver and kidneys through blood loss, pressure effects and intoxication." Penrose, in 1908, wrote, "The effect of tumors of large size upon the heart and blood vessels has been remarked by several writers. Fatty degeneration and brown atrophy have been found associated with uterine fibroids in a number of instances. This is undoubtedly the explanation of some cases of death after operation."

Martin has called attention to the disposition to thrombosis and embolism which seems to be especially marked in the telangiectatic form of tumor. This also explains some of the cases of sudden death that occur after operation. Operators have observed cases of sudden death, probably from embolism, occurring sometimes several weeks after hysterectomy for fibroid tumor.

Other writers are not so insistent upon the causal relation between the uterine growth and cardiac defect. Dudley⁷ and later Cameron⁵ say hardly a word about any cardiac damage in their discussion of uterine fibroids, whereas, Bell³ states that "sometimes the heart and blood vessels undergo considerable degeneration of the muscular tissue."

As to the cause of the degeneration, there is no unanimity of opinion. The older writers spoke of the "toxic effect" of the myoma. Some even theorized an actual substance not unlike that produced by toxic adenomas of the thyroid gland. In more recent years, however, less credit is given to theories which emphasize the toxic effects.

Kelly and Cullen¹³ in studying about 1,000 cases of uterine myomas found cardiac impairment in only about 10 per cent of the patients. Most of the murmurs they regarded as functional. Their "experience coincides with the view expressed by Leopold that the cardiac changes are usually functional and are a direct result of the anemia caused by the uterine hemorrhage."

Other evidences of cardiac insufficiency have been pointed out by Polak,¹⁵ Bland,⁴ Auspach,¹ and others. They note palpitation, increase in pulse rate and dyspnea, besides murmurs at the various valves. The latter they ascribe to anemia or to dilatation of the chambers of the heart.

at the time of first menstruation. However, hair may not develop in the axillae until later, after the menarche, although Priesel and Wagner²⁶ note exceptions when it appears very early.

FUNCTIONAL SIGNIFICANCE OF THE MENARCHE

The inception of menstruation can thus in no way be considered as the end point of the pubescent age nor as the factor which initiates the changes of this period. In addition, there is evidence which suggests that the menarche does not even represent complete sexual maturity.

Mirskaia and Crew²⁸ found that in the mouse the onset of the first estrus was followed by a period of adolescence during which only a small percentage of females conceived, there were many incomplete pregnancies, and the mothers exhibited a tendency to eat their young. A related phenomenon was observed in the rhesus monkey by Hartman.²⁰ Fifteen females averaged 3,350 gm. in body weight at the time of the first menses, and although most of them were mated soon after puberty, not a single one conceived until an interval of about one year had elapsed and they had attained a weight of 4,370 gm.

Hartman²⁰ has recently pointed out that a relative sterility probably exists in women during adolescence in spite of the existence of occasional instances of gestation in very young individuals. Vignes²⁹ states that "the inception of menstruation does not necessarily mean the capacity for conception; many girls who are just beginning to menstruate would conceive with difficulty." Hartman²⁰ has also drawn attention to a number of observations made in countries where marriages take place at the time of puberty, and they indicate that conception does not occur for an average of about three years after the onset of the first menses. He quotes a gynecologist, Mondière, who "spent some years in Cochin China, where he gathered certain data (first menses, first parturition, number of children, menopause, etc.) concerning 960 Annamite, 106 Chinese, and 87 Cambodian women. He found that the first menstruation took place on the average at 16½ years in the Annamites, at 16½ in the Chinese, at 16½ in the Cambodians; the first parturition in these groups at 20½, 16½, and 22½ years respectively, despite their early marriages." Malinowski³⁰ likewise noted that among the Trobriand Islanders pregnancy among young unmarried girls is extremely rare despite the absolutely unrestrained and promiscuous sex life which begins in childhood.

The fact that the inception of cyclic uterine bleeding in the human adolescent is not necessarily coincident with the acquisition of the ability to successfully bear children is of considerable biologic importance. The problem is in some ways related to the induction of "precocious sexual maturity" in laboratory animals by the administration of anterior pituitary substances, and it seems evident, as Engle³¹ states, that a general somatic maturity is essential for the establishment of a complete reproductive potential.

ENDOCRINE GLANDS

Since all the manifestations of the pubescent and adolescent periods are considered as due to the activity of the glands of internal secretion, it is inevitable that attention should be directed to these organs

remaining 50 per cent, changes in the cardiovascular system were present in varying degrees, as evidenced by the history, physical examination, and electrocardiogram.

Clinically the 9 patients, whose electrocardiograms showed questionable or definite myocardial degeneration, had the following impairments: 2 had hypertension with nephritis; 2 had mild nephritis without hypertension; 1 had advanced nephritis and pulmonary tuberculosis.

END-RESULTS

Of the 30 cases, 3 were not operated upon. One died twenty days after admission following a transfusion; 1 refused operation, and, in 1 case, operation was not advised because of an associated tuberculosis and nephritis.

Of the 27 operated upon, 2 (7.4 per cent) died. One died five days postoperatively from paralytic ileus. Although this patient had mitral regurgitation and electrocardiogram changes indicating myocardial damage, there is a reasonable assumption that these did not predispose to her demise. The other patient died six days after operation from a low-grade peritonitis. This patient had no cardiac symptoms and the electrocardiogram was normal.

The other patients made uneventful recoveries.

The contrasting nonfibroid group of patients showed the following results in the electrocardiograms (Table III).

TABLE III. ELECTROCARDIOGRAMS IN GROUP OF NONFIBROID PATIENTS

Normal	15	50%
Left axis deviation	7	23%
Definite myocardial degeneration	7	23%
Coronary sclerosis	1	3%

It will be seen from Tables I and II, as already stated, that, in one-half of the cases, there was demonstrable neither clinical nor electrocardiographic evidence of cardiac disease. In the remaining 50 per cent, changes in the cardiovascular system were present in varying degrees, as evidenced by the history, physical examination, and electrocardiogram. Let us analyze these findings and see whether the association is merely accidental or real.

Certain facts must be evaluated to enable us to give the proper amount of weight to the findings.

Age.—The average age of the group of fibroid cases was forty-one years; the youngest being twenty-three, the oldest sixty-one. Of those who complained of cardiac symptoms, however mild, the average age was forty-two.

This is the age at which degenerative changes come to the foreground, even in otherwise normal persons. It is of great significance that the nonfibroid cases showed an average age almost exactly that of the myoma group, viz. 40.8 years, and the electrocardiographic findings were quite comparable (see Table III).

Anemia.—Many authors have felt that some, at least, of the degenerative heart changes were due to impoverishment of the blood. There is no denying the fact that anemia will in time produce changes in various organs, to which the heart is no exception. Some gynecologists have taken the arbitrary stand of not operating upon patients whose hemoglobin is below 40 per cent. In this series, the range was from 100 per cent down to 35 per cent. The patient whose hemoglobin was 35 per

In a study of 3,140 menstrual cycles in 100 pubescent girls, Engle and Shelesnyak² found a great variability. The cycles ranged from 7 to 256 days with the mode at 28 and a mean of 33.9, and while the variability of the earliest menstrual cycles was higher it decreased with menstrual age. There were many periods of amenorrhea, since 202 out of the 3,140 cycles were more than fifty-seven days in length, and these were more prone to occur during the summer months.

TREATMENT OF MENSTRUAL DISORDERS

In spite of the many important facts brought to light by investigations of the past few years, there is still much obscurity regarding the significance of many of the changes of the pubescent period. It seems definitely established, however, that the appearance of the first menstruation is merely one of a series of events which culminate in a few years in complete somatic and sexual maturity. In the interval, the menstrual cycles are characterized by great irregularity in length, are frequently interposed by long periods of amenorrhea, and, in view of the comparative sterility, are incomplete from a functional standpoint.

It is very important to keep these facts in mind in considering the menstrual disorders of this period. A careful examination must always be conducted in order to eliminate any systemic condition or organic pelvic disease, but in most instances no specific therapy is indicated. This applies particularly to cases of amenorrhea or delayed appearance of the menarche, but it should be remembered as a general principle which applies to all "functional" menstrual disturbances of the puberty. If, however, it should be deemed advisable to treat such patients, general hygienic measures, diet, exercise, should be employed. By such methods, for example, Clow³⁶ was able to decrease the incidence of severe dysmenorrhea in schoolgirls from over 40 per cent to less than 6 per cent. The use of gonadotropic hormones or estrogenic substances is not warranted except in certain types of uterine bleeding. The administration of thyroid extract, however, remains one of the most valuable therapeutic agents, and careful investigation should always be made for the existence of a hypothyroid state.

Menorrhagia and metrorrhagia are especially prone to occur during the years of puberty, and are invariably due to hyperplasia of the endometrium (Wolfe³⁷), which results from an ovarian deficiency characterized by a growth of follicles and an absence of ovulation and corpus luteum formation. This condition is of special interest in view of its resemblance to the "anovulatory cycles" of monkeys (Fluhmann³⁸), which occur with greater frequency during puberty, and which Hartman³⁹ considers as the explanation for the comparative sterility of this period. Although it is not possible to determine with certainty the incidence of hyperplasia endometrii in young women, there are some suggestive clinical signs which may be employed in

ABSCESS OF THE OVARY*

WILLIAM T. BLACK, M.D., F.A.C.S., MEMPHIS, TENN.

(From the Department of Gynecology, University of Tennessee, College of Medicine)

THIS presentation consists of a study of 105 suppurating ovaries, 80 of which occurred in the Gynecological Service of the Memphis General Hospital, and 25 in the Baptist Hospital, from November, 1932, to May, 1935. A previous report of 105 cases (South. M. J. 26: 630, 1933) is not incorporated in this report. Eighty suppurative ovaries occurred in 1,366 operative cases of pelvic inflammatory disease, an incidence of 6 per cent. Twenty-five cases were present in 696 cases of pelvic inflammatory disease requiring surgery, an incidence of 3.06 per cent.

The frequency of occurrence of ovarian suppurations has been noted apparently by two other observers. Chomé found 15.45 per cent of ovarian suppurations in 110 cases of salpingitis in the Clinique Tarnier. Darnall stated that he found 12.4 per cent of ovarian suppurations in 9,872 laparotomies for pelvic infections at the Atlantic City Hospital.

In my previous report suppurations of the ovary occurred in 7.01 per cent (corrected percentage) of operative pelvic infections. A conservative estimate is that approximately 6 per cent of operative pelvic inflammatory disease will have a suppuration of the ovary. If the clinical, instead of the pathologic, diagnosis is accepted as the final diagnosis, the percentage will be much higher.

The clinical course and laboratory findings are quite different in the presence of a suppurating ovary from the usual pelvic infection. Therefore, an attempt at a differential diagnosis of pelvic inflammatory pathology should be made. One will find a difference in the etiology, bacteriology, pathology, and clinical findings in a tubo-ovarian abscess from that found in a pyo-ovarium. By a careful study of the etiology, symptomatology, and the physical findings, a preoperative diagnosis may at times be made between these lesions. I am convinced that the neisserian organism is responsible in nearly 100 per cent of tubo-ovarian abscesses. A tubercular tubo-ovarian abscess is an exception. None of this group was tuberculous and only one of the previously reported 105 cases was tuberculous. The frequent occurrence of gonorrheal pelvic infection causes the tubo-ovarian suppurations far to exceed the number of pyo-ovariums. It is possible that pyo-ovarium may be due to the gonococcus, yet the tubes remain free and do not enter into the suppurative cavity.

*Thesis for Admission to Membership. Read at the Forty-Eighth Annual Meeting of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons held at Skytop, Pa., September 16 to 18, 1935.

Geburtsh. u. Gynäk. 89: 364, 1925-26. (14) *Slonaker, J. R., and Card, T. A.*: Am. J. Physiol. 64: 35, 1923. (15) *Boas, F.*: Science 72: 44, 1930. (16) *Crew, F. A. E.*: Tr. 2nd Int. Congress, 1931. (17) *Curjel, D. F.*: Indian J. M. Research 8: 366, 1920. (18) *Biedl, A.*: Monatsch. f. Kinderh. 31: 347, 1925-26. (19) *Steinach, E., and Kammerer, P.*: Arch. f. Entwicklungsmech. 46: 391, 1920. (20) *Hartman, C. G.*: Science 74: 226, 1931. (21) *Ploss, H., Bartels, M., and Bartels, P.*: Das Weib in der Natur und Völkerkunde, Leipzig, Grieben, ed. 9, 1908. (22) *Stratz, C. H.*: Der Körper des Kindes und seine Pflege, ed. 11, Stuttgart, 1928, Ferd. Enke. (23) *Godin*: Quoted by Rosenstern (25) and others. (24) *Demmè*: Quoted by R. Schroeder in Veit's Handb. d. Gynäk., ed. 3, Vol. 1, Pt. 2, Munich, 1928, J. F. Bergmann. (25) *Rosenstern, J.*: Ergebn. d. inn. Med. u. Kinderh. 41: 789, 1931. (26) *Priesel, K., and Wagner, R.*: Ztschr. f. Konstitiologie. 15: 333, 1931. (27) *Dieckmann, H.*: Virchow's Arch. f. path. Anat. 256: 321, 1925. (28) *Mirskaia, L., and Crew, F. A. E.*: Quart. J. Exper. Physiol. 20: 299, 1930. (29) *Vignes, H.*: Physiologie Gynécologique, Paris, 1929, Masson et Cie. (30) *Malinowski, B.*: Sexual Life of Savages, New York, 1929, Liveright. (31) *Engle, E. T.*: Endocrinology 15: 405, 1931. (32) *Rowntree, L. G., Clark, J. H., and Hanson, A. M.*: Science 80: 274, 1934. (33) *Fluhmann, C. F.*: AM. J. OBST. & GYNEC. 27: 73, 1934. (34) *Paton, J. H. P.*: Brit. M. J. 2: 444, 1927. (35) *Knaus, H.*: Die Periodische Fruchtbarkeit und Unfruchtbarkeit des Weibes, Vienna, 1934, W. Maudrich. (36) *Clow, A. E. S.*: Brit. M. J. 2: 511, 1920. (37) *Wolfe, S.*: AM. J. OBST. & GYNEC. 12: 45, 1926. (38) *Fluhmann, C. F.*: Surg. Gynec. Obst. 52: 1051, 1931. (39) *Lisser, H.*: Endokrinol. 5: 138, 1929.

STANFORD UNIVERSITY HOSPITAL

STATISTICAL STUDIES ON PUERPERAL INFECTION

II. AN ANALYSIS OF 545 CASES OF PUERPERAL INFECTION (INCLUDING A COMPARISON BETWEEN THEM AND A SIMILAR GROUP OF CASES WITH NORMAL PUERPERIA)

C. H. PECKHAM, M.D., BALTIMORE, MD.

(From the Department of Obstetrics, the Johns Hopkins University and Hospital)

IN A previous communication the author presented an analysis of the occurrence of puerperal infection in 5,767 consecutive term deliveries. This first paper dealt with the factors influencing the incidence of puerperal infection. In order to amplify this study and to further emphasize certain of its conclusions, it seemed of value to examine carefully the history, clinical course, and laboratory examinations in a series of patients developing a frank intrauterine infection during the puerperium. Furthermore, in order to provide a suitable comparison, an analysis was also made of a similar group of women whose puerperia showed no febrile reaction. The results of these analyses and their correlations comprise this second statistical study of puerperal infection.

These cases of puerperal infection to be analyzed consist of 545 patients delivered at or near term on the Obstetrical Service of the Johns Hopkins Hospital from Sept. 12, 1925, to Aug. 24, 1933, excluding all cases of cesarean section. The course after delivery in all of these patients satisfied the criteria employed in this Clinic for the diagnosis of puerperal infection: namely, a temperature of 100.4° or above on two or more days, not necessarily successive and excluding the first twenty-four

found. Urine and Kahn negative. Temperature became normal several days before operating. Hemoglobin, 66 per cent, R.B.C., 3,000,000; sedimentation time (July 26, 1934), eleven minutes; Aug. 12, 1934, thirty minutes. Operation revealed a left pyo-ovarium the size of an orange. Left tube normal. A right salpingo-oophorectomy was performed several years previous to her present trouble. Rupture occurred during removal of pyo-ovarium and the patient succumbed on the ninth day, from peritonitis. From multiple abscesses present were grown the streptococcus and staphylococcus. Infection from the mouth via the circulation was the only logical etiology. If a suppurative ruptured appendix occurs during a recent ruptured follicle, infection of the ovary may occur.

CASE 2.—Mrs. M., aged fifty, para v, one miscarriage. Entered the Baptist Hospital, Aug. 7, 1934, complaining of severe lower right-sided abdominal pain, vomiting, and cramping. Three months previously she had an attack of appendicitis, but was not operated upon. Did not convalesce from the appendicitis and her symptoms became worse several days before entering the hospital. A diagnosis of an ovarian abscess was made from her history, physical findings, and laboratory tests. Wassermann was negative. After a few days the white count dropped from 16,150 to 7,600, but the sedimentation time only dropped from thirteen to twenty-two minutes. Temperature was normal several days preoperatively. At operation the appendix was found to be communicating with a right pyo-ovarium. Left appendages were normal. Culture from pus was positive *Streptococcus hemolyticus*. The ovarian abscess evidently resulted from her appendicitis. Patient recovered.

In pelvic cellulitis, diverticulitis, pelvic peritonitis, or appendicitis, the ovary may become infected as in the above case by contiguity of tissue. Pyo-ovarium as a complication of an infected fibromyoma, carcinoma of the uterus, septic endometritis, or following puerperal or postabortive infections, the route of infection is by contiguity of tissue.

The teaching of Championniere, that infection of the ovary occurs through the lymphatics from the uterus, has been disproved by the investigations of Poirier and Cornet, who injected mercury into the muscle of the uterus, and by Bauereisen, who injected tubercle bacilli. Chomé has also shown that streptococcal lymphangitis within the broad ligaments with a suppuration of the preaortic glands did not involve the ovary.

It is my opinion that the corpus luteum abscess is due only to those conditions whereby the ovary is exposed to direct infection by contiguity of tissue and that all abscessed ovaries are not corpus luteum primarily as formerly taught. Infection via the hematogenous route through the hilum of the ovary and from the corpus uteri via the ligament to the ovaries are exceptions. Infection may also pass through the uterine wall and broad ligaments to the ovaries in postabortal and postpartum cases by contiguity of tissue.

The symptoms of a suppurating ovary depend upon the etiology, the length of time affected, the size, and the location. The laboratory findings depend upon whether or not the pus is sterile or infected. The clinical findings depend on whether or not the infection is neisserian or due to some other organism. The symptoms of an acute gonorrheal

It has been our general experience that the incidence of operative delivery is higher in the white than in the black race despite the fact that pelvic contraction occurs three times as often in the latter group of patients, and accordingly it will be noted in Table II that with operative delivery white patients predominate in both the normal and the

TABLE II. PER CENT OF TOTAL CASES

COLOR	F. T. S.		F. T. O.		TOTAL INCLUDING PR.	
	P. I.	NORMAL	P. I.	NORMAL	P. I.	NORMAL
White	29.53	51.45	54.43	68.54	38.40	53.60
Black	70.47	48.55	45.57	31.46	61.60	46.40

puerperal infection groups. However, in the latter group the incidence for the two races was almost equal, while in the former (normal puerperium) more than two-thirds of the patients were white; an observation which again demonstrates the decreased resistance of the black woman to puerperal infection.

3. *Age of Patient.*—Table III further illustrates the fact that with advancing age there seems to occur an increasing resistance to puerperal infection, and it might be added that, although not shown in the table, a similar discrepancy exists between the normal and infected groups

TABLE III

	MEAN AGE IN YEARS		PER CENT YOUNG PRIMIPARAS		PER CENT ELDERLY PRIMIPARAS	
	P. I.	NORMAL	P. I.	NORMAL	P. I.	NORMAL
F. T. S.	21.76	23.47	13.45	7.62	0.58	0.25
F. T. O.	23.37	25.46	10.13	7.53	1.90	3.23
Pr. S.	22.78	24.38	0.00	0.00	0.00	0.00
Pr. O.	25.00	26.25	12.50	12.50	0.00	0.00
Total	22.32	23.89	11.98	7.44	0.95	0.76

when primiparas alone are considered. Moreover, the incidence of young primiparas (aged sixteen years or less) is much higher in the febrile group although the difference between the two series when elderly primiparas (aged thirty-five years or more) are considered is so small as to be within the limits of sampling error.

4. *Parity of Patient.*—The material of a teaching clinic usually contains an abnormally high percentage of primiparas as contrasted with

TABLE IV. PER CENT OF TOTAL CASES

PARA	F. T. S.		F. T. O.		TOTAL INCLUDING PREMATURES	
	P. I.	NORMAL	P. I.	NORMAL	P. I.	NORMAL
i	71.51	54.29	79.50	64.53	72.66	55.36
ii	10.89	18.67	6.83	11.83	10.09	17.73
iii	6.98	9.09	2.48	5.37	6.24	8.41
iv, v	4.19	8.35	1.86	4.30	3.67	7.81
vi, vii	3.25	4.44	1.86	8.60	3.12	5.34
viii, ix	1.96	2.22	3.73	5.37	2.39	2.86
x and over	1.12	2.94	3.73	0.00	1.83	2.49

the acute symptoms are those of an acute unilateral abdomen. In the presence of large pelvic growths the pathology is often masked; however, acute pelvic symptoms appearing under such circumstances should arouse a suspicion of a pyo-ovarium.

In hematogenous pyo-ovarium complicating typhoid, parotitis, influenza, pneumonia, infections of the mouth, etc., the symptoms are those of an acute unilateral abdominal disturbance. In these cases there is an absence in the history of any previous pelvic pathology. Pyo-ovarium may not be suspected in such cases, which may result in serious consequences. The organism present is the same as in the original focus. A continuation of illness after a cessation of the original disease may thus be explained.

The pyo-ovarium varies in size from that of a bird's egg to a grapefruit. It does not obtain great dimensions, as in a tubo-ovarian abscess, or an infected ovarian cyst. The lesion may produce constitutional as well as local symptoms. Such abscesses rarely rupture into the intestine or bladder, but may rupture into the abdominal cavity producing peritonitis. Rupture during an operation or the second stage of labor is hazardous. The etiology of misunderstood pelvic infections following a normal labor can in some instances thus be explained. A pregnant woman with a unilateral ovarian mass should be studied in order to eliminate the presence of infection.

A suppurative ovarian cyst may occasionally produce ovarian destruction. The symptoms in some are most severe, depending upon the bacteria responsible, the size and location of the tumor. It may extend up above the umbilicus and adhere to all surrounding structures. It may rupture into the peritoneal cavity, producing peritonitis, intestinal obstruction, or may empty into the intestines or bladder cavities, or perforate through the abdominal wall forming fistulas. The clinical findings and the laboratory tests are, during the acute stage, in the superlative degree.

A history of exposure to a venereal disease, with positive smears, or the stigmas of a previous gonorrheal infection, justifies one in the belief that the mass is a tubo-ovarian abscess. As the tubo-ovarian abscess is gonococcal in origin, the pus is usually sterile, consequently a spilling during an operation is not nearly so dangerous as in a pyo-ovarium.

Among both groups only frank pus cases diagnosed by the pathologist are reported. In eight pyo-ovariums occurring concomitantly with ten fibromyomas, a chronic pelvic infection existed; however, the tubes were not connected with the ovary and their ostiae were closed. In two fibromyomas and pyo-ovariums the tubes and other pelvic structures were normal; both were infected with the streptococcus. The sedimentation time was less than thirty minutes, but the temperature and white count were normal before operating. In twenty cases of pyo-ovariums chronic pelvic pathology was present, but the tubes were not connected

of spontaneous and operative deliveries are contrasted and only those patients admitted late in labor are considered, definite reversals of ratio occur. Thus, with spontaneous delivery, the preponderance of incidence is on the normal side and is 26.91 per cent as contrasted with 18.47 (infected group), whereas with operative delivery the reverse is found with 9.67 per cent in the normal and 19.33 per cent in the infected groups, respectively. No unequivocal explanation for these discordant findings is evident, although one might hazard the generalization that they indicate that if delivery is to be speedy and spontaneous, late admission to the hospital is without harm, while if some operative procedure will be necessary to terminate labor, it is of benefit to the patient to place herself under supervision as early as possible.

6. *Relation of Rupture of Membranes to Admission to the Hospital.*—Although it was impossible to determine any definite effect on the incidence of puerperal infection according to the duration of labor at the time of admission to the hospital a very definite correlation was found to exist when the time of admission was studied in terms of rupture of the membranes, and this is demonstrated in Table VI. Thus, when spon-

TABLE VI. PER CENT OF TOTAL CASES

	F. T. S.		F. T. O.		TOTAL INCLUDING PR.	
	P. I.	NORMAL	P. I.	NORMAL	P. I.	NORMAL
Before admission	21.03	7.01	20.45	5.62	20.48	7.66
After, spontaneous	45.02	61.30	28.03	51.68	40.00	58.06
After, artificial	33.95	31.68	51.52	42.70	39.52	34.27

taneous rupture of the membranes occurred prior to admission, the incidence of patients in the group of puerperal infection was three times as high as in the normal group when delivery was spontaneous and almost four times as high as when operative. Furthermore, this table shows that an increased rate of infection obtained when instrumental rupture was done after admission, which might indicate a hazard incident to this procedure when practiced after the onset of labor, although we have not found such to result when rupture was done to induce the process of parturition. From the two foregoing analyses it would seem that the duration of labor at the time of admission plays little rôle in the production of a subsequent infection, provided that hospitalization is accomplished prior to rupture of the membranes.

7. *Rupture of Membranes in Terms of Hours Before Delivery.*—Table VII indicates a rather direct correlation between the number of hours prior to delivery of rupture of the membranes and the incidence of puerperal infection. From this analysis a fairly sharp dividing line may be made at twelve hours, and providing not more than that time elapses between rupture of the membranes and delivery, the infection rate is not increased. However, when more than twelve hours elapse the inci-

eide with the above findings. In only one case was the pneumococcus (Type II) found in a study of 210 suppurating ovaries.

TABLE II

Group 2.—Baptist Memorial Hospital from November, 1933 to May, 1935.

In 696 pelvic infections there were 25 suppurative ovaries.

PYO-OVARIIUMS		TUBO-OVARIAN ABSCESES	
Right side	3	Right side	4
Left side	5	Left side	8
Not stated	1	Not stated	2
		Bilateral	2
	<hr/> 9		<hr/> 16

Occurrence: Pyo-ovarium, 1.02 per cent; tubo-ovarian abscesses, 2.08 per cent; combined groups, 3.06 per cent.

Average sedimentation time, thirty minutes; average white count, 10,883.

Average length of illness, thirteen and one-half months; preoperative days in hospital, eight.

In 25 patients of the last group there was one positive Wassermann (4 per cent), while in the other there were 25.03 per cent positive reactions. One patient who died had been sent home for two months to rest. Upon readmission her temperature was normal, white count 7,050, but the sedimentation time was thirteen minutes. After two weeks' hospitalization, the sedimentation time remained fast (twenty-two minutes). Her general condition was good. The operation was technically difficult, due to the gross pathology. Culture, positive for streptococcus and staphylococcus. Died of shock, first twenty-four hours. All were white and below par as surgical risks.

TREATMENT

Surgery is the only curative treatment. When to operate depends upon the experience and judgment of the surgeon. Sufficient time must elapse for the exudate to be absorbed and restoration to take place (many oophoritis cases will clear up). The average time elapsing before surgical means was instituted in the above cases was one and a half years. However, in pyo-ovarium without involvement of other internal generative organs, it is unnecessary to wait so long, thereby subjecting the patient to the danger of rupture or focal infection.

In the tubo-ovarian abscess where the neisserian organism is responsible longer delay is permissible, as the pus is usually sterile. It is unnecessary to wait for the sedimentation time to reach ninety minutes or over (the rule followed in the University of Tennessee Clinic), for months may intervene and the sedimentation time may remain fast.

A large suppurating ovarian cyst, pointing in Douglas' culdesac should be evacuated first by a colpotomy. Rarely, if ever, should a tubo-ovarian abscess or a pyo-ovarium have a colpotomy. In a large abscess, not pointing in the culdesac, a laparotomy removing the tumor intact is desirable. If unable to remove it in its entirety, suction drainage should precede its extirpation. The presence of dense adhesions and large blood

identical in the normal and infected groups. For the total patients with puerperal infection a considerably higher incidence of vaginal examination was noted than in the normal group, but this is chiefly due to the increased number of women in the former group who were delivered by operative means as contrasted with the latter series. The finding of a similar incidence of vaginal examinations in both infected and normal

TABLE IX

	F. T. S.		F. T. O.		TOTAL INCLUDING PR.	
	P. I.	NORMAL	P. I.	NORMAL	P. I.	NORMAL
Per cent of total cases examined	21.23	21.62	90.06	89.23	43.12	34.35

series with spontaneous delivery seems significant and, although rectal palpation undoubtedly constitutes a great advance in obstetric art, we feel that the above figures indicate that with proper surgical precautions vaginal examination does not necessarily materially increase the risk to the patient.

10. *Rectal Examinations.*—Table X indicates the number of rectal examinations made in the two series of cases under analysis and shows an increased number generally in the infected as contrasted with the normal group. Thus, the mean number of such examinations per patient

TABLE X. PER CENT OF TOTAL CASES

NUMBER OF RECTAL EXAMINATIONS	F. T. S.		F. T. O.		TOTAL INCLUDING PR.	
	P. I.	NORMAL	P. I.	NORMAL	P. I.	NORMAL
0-4	60.33	72.48	39.13	52.68	55.05	69.66
5-9	31.56	23.59	33.54	32.26	31.38	24.43
10-19	4.47	3.44	20.50	11.83	8.99	4.96
20 and over	1.12	0.00	3.11	2.15	1.65	0.38
Unknown	2.51	0.49	3.73	1.07	2.94	0.57

with subsequent puerperal infection was 5.32 while for the normal group the lower figure of 3.97 was found. It is believed that this discrepancy is almost entirely to be explained in terms of a general prolongation of labor found in the infected series with a consequent increase of examining procedures.

11. *Duration of First Stage of Labor.*—The arbitrary time divisions noted in Table XI are employed in order to differentiate between precipitate labor (under three hours), normal labor (three to thirty hours), and prolonged labor (thirty hours and over). It will be observed that in multiparas a greater percentage of patients in the infection group had precipitate labors than in the normal series. No explanation seems evident for this finding other than that it is probably due to a sampling error since in the series of primiparas it does not hold good. This table

PELVIC MEASUREMENTS IN THE WHITE AND COLORED FEMALE AND THEIR SIGNIFICANCE IN CHILDBIRTH*

A STUDY OF 1,400 CASES

W. T. PRIDE, M.D., MEMPHIS, TENN.

DURING my twenty years of obstetric work in the South, I have observed that if we were to depend upon pelvic measurements used in the North as criteria, there would be numerous unnecessary cesarean sections performed. As a matter of fact very little operative interference has been practiced and the results demonstrate the wisdom of such conservatism.

The study of pelvic measurements presented here has been undertaken with two purposes in mind: first, to show graphically the comparisons between negro and white women in the South and to further compare such data with similar data from northern hospitals;† second, to determine to what extent pelvic measurements should be taken as an indication for cesarean section. Over 400 cases have been reviewed from my own private practice and from the Memphis Hospital. This may be considered a small number upon which to base conclusions, but these cases are consecutive and the measurements have been very carefully taken, internal measurements having been recorded in each case. As additional data for comparison, some 1,000 cases have been compiled from the Cook County Hospital, Chicago, where a large number of negro cases are on record. Unfortunately only external measurements are given and emergency cases without complete data break the series. The series is consecutive, however, except for these omissions.

Very little previous work has been done on the comparison of the negro and white pelvis. Riggs, in 1904, made his study of the pelvis in negro and white women, based on 1,500 cases at the Johns Hopkins Hospital. In this series all cases of premature and multiple births were omitted. Williams, in 1899, studied the frequency of contracted pelvis in women, based upon the first 1,000 delivered at the Johns Hopkins Hospital. In addition to that he has very briefly reported upon the occurrence of pelvic deformities in his text (4,000 cases).

Adair has shown that pelvis of French women are uniformly smaller than those of American women. Emmons in a study of American squaws, Acosta-Sison of the Philippine, and Lane of Eurasians, East Indians and Bengalis, find that the women of these races are also smaller in pelvic measurements than the American white women.

*Thesis for admission presented at the Forty-Eighth Annual Meeting of the American Association of Obstetricians, Gynecologists, and Abdominal Surgeons, held at Skytop, Pa., September 16 to 18, 1935.

†For lack of space it is not possible to include all of the author's graphs.

TABLE XIII. PER CENT OF TOTAL CASES

DURATION IN MINUTES	F. T. S.		F. T. O.		TOTAL EXCLUDING PR.	
	P. I.	NORMAL	P. I.	NORMAL	P. I.	NORMAL
0-14	85.67	89.16	73.29	73.11	81.82	86.17
15-29	13.20	9.85	19.88	20.43	15.28	11.82
30-59	0.84	0.98	4.35	5.38	1.93	1.80
60 and over	0.28	0.00	2.48	1.07	0.97	0.20
Mean duration	9 min.	9 min.	12 min.	13 min.	10 min.	10 min.

that it may be discarded as a factor in the production of puerperal morbidity unless operative procedures become necessary to terminate it or to control hemorrhage coincident to it.

Table XIV shows the mean total duration of labor in the two groups of patients with normal as contrasted with febrile puerperiums. It is interesting to note the discrepancy in the observed differences among the

TABLE XIV

	P. I.	NORMAL	DIFFERENCE
F. T. S., primiparas	16 hr. 26 min.	14 hr. 56 min.	1 hr. 30 min.
F. T. O., primiparas	24 hr. 24 min.	19 hr. 38 min.	4 hr. 26 min.
Total primiparas	19 hr. 5 min.	15 hr. 58 min.	3 hr. 7 min.
F. T. S., multiparas	11 hr. 54 min.	10 hr. 57 min.	0 hr. 57 min.
F. T. O., multiparas	22 hr. 29 min.	11 hr. 56 min.	10 hr. 33 min.
Total multiparas	14 hr. 23 min.	11 hr. 7 min.	3 hr. 16 min.

groups of spontaneous versus operative delivery and further emphasizes the already attested observation that prolonged labor and operative delivery affords an almost ideal combination for subsequent intrauterine infection.

15. *Tears, Perineal and Cervical.*—From a study of Table XV it would seem that perineal tears and episiotomies contribute but little to the etiology of puerperal infection, although in the group with spontane-

TABLE XV. PER CENT OF TOTAL CASES

TEAR	F. T. S.		F. T. O.		TOTAL INCLUDING PR.	
	P. I.	NORMAL	P. I.	NORMAL	P. I.	NORMAL
First degree	17.04	24.32	9.32	12.90	14.31	21.37
Second degree	12.85	16.71	26.71	6.45	16.33	14.12
Episiotomy	10.89	3.68	34.78	46.24	17.43	11.26
Third degree	0.84	1.23	1.86	0.00	1.10	0.95
Total	41.62	45.94	72.67	65.59	49.17	47.70
Cervical	1.12	0.00	9.32	6.45	3.67	1.14

ous delivery episiotomy was performed about three times as often in the series with infected puerperiums as among the normal controls. However, including all degrees of tears, as well as episiotomy, it will be noted that some external perineal trauma occurred more frequently in the normal than in the infected series (spontaneous delivery alone). It

METHOD OF PREPARING GRAPHS

In preparing the tables the material was taken from the hospital records and condensed into the smallest form possible.

In making the percentage frequency graphs (Figs. 1 to 5), the total number of cases in which a given diameter was reported was counted. This figure was used as a basis on which to calculate the percentage. Then each length in that diameter

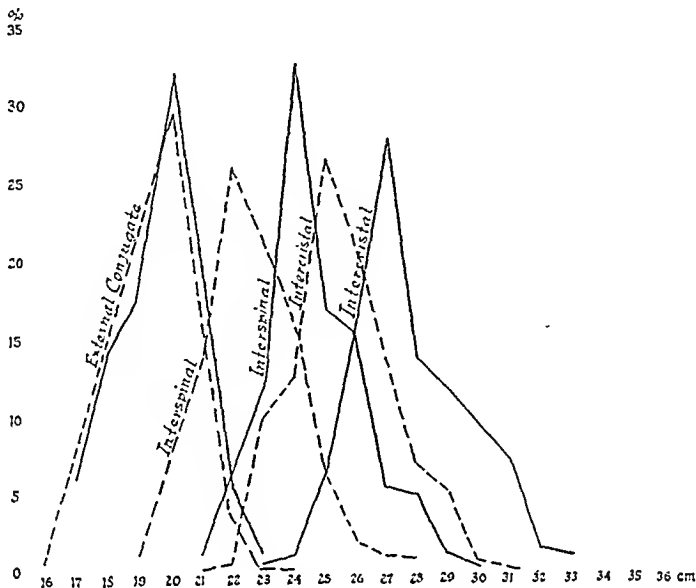


Fig. 2.—Cumulative frequency graph showing external measurements at the Memphis Hospital in white (solid lines) and negro (broken lines) women.

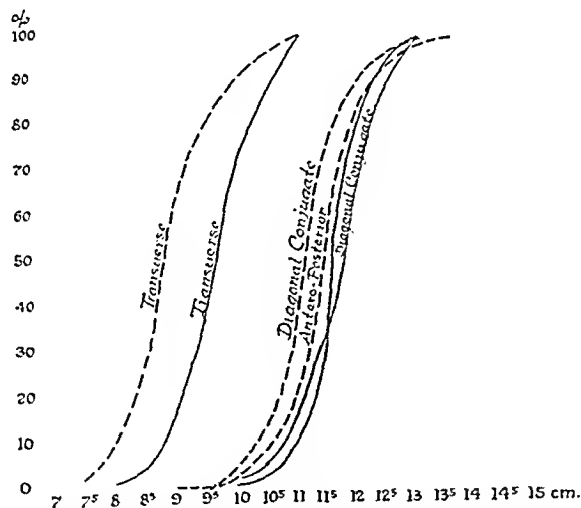


Fig. 3.—Cumulative frequency graph showing internal measurements at the Memphis Hospital of white (solid lines) and negro (broken lines) women.

was counted and from these two figures the percentage for each length within the diameter was figured. The percentages were then plotted as is shown in the completed graphs. The cumulative graphs were obtained by starting with the percentage of the shortest length and then adding to it the others, one additional each time (shortest length, and the next to the shortest, shortest, next to the shortest, and second from the shortest, etc.). The cumulative graph at any one point shows the percentage of cases having that length or less. Since the cumulative graphs move in one direction

TABLE XVIII. PER CENT OF TOTAL CASES

COMPLICATIONS	F. T. S.		F. T. O.		TOTAL INCLUDING PR.	
	P. I.	NORMAL	P. I.	NORMAL	P. I.	NORMAL
Toxemia	23.74	24.32	31.68	33.33	26.24	26.72
Syphilis	10.61	6.63	13.66	4.30	12.11	6.87
Pyelitis	6.15	0.49	9.94	0.00	6.97	0.38
Tuberculosis	1.68	0.49	0.62	0.00	1.28	0.38
Cardiac disease	0.56	0.74	1.86	0.00	0.92	0.57
Respiratory infection	1.12	0.24	3.11	0.00	1.83	0.19
Other	1.68	0.24	1.24	0.00	1.47	0.19
Total	45.54	33.15	62.11	37.63	50.82	35.30
Total without repeaters	39.11	31.94	47.20	37.63	42.02	33.97

However, syphilis, tuberculosis, and respiratory infection seemed definitely to enhance the probability of subsequent infection, as did pyelitis, although the relation between this complication and puerperal infection was obviously to be expected.

ANALYSIS OF GROUP WITH PUERPERAL INFECTION

1. *Days Postpartum at Onset of Fever.*—From Table XIX it will be seen that in five-sixths of the total patients, the puerperal infection began to manifest itself in terms of a febrile reaction (100.4° F. or above)

TABLE XIX. PER CENT OF TOTAL CASES

DAYS	F. T. S.	F. T. O.	TOTAL INCLUDING PR.
1	20.95	32.30	24.77
2	20.95	25.47	22.39
3	20.39	13.04	18.90
4	21.23	11.80	17.80
5	5.03	7.45	5.50
6	6.15	3.73	5.32
7 and over	5.31	6.21	5.32
Mean number days	3.16	2.80	3.01

in the first four days after delivery. Almost a fourth of the cases became febrile in the first twenty-four hours, which in our opinion is too short a time for an infection attained at the time of delivery to become evident clinically. In only about 5 per cent did a week or more elapse before the febrile reaction occurred, and it is our opinion that in the majority of these cases the infection was gonococcal in origin, this opinion being frequently confirmed by cervical smear although culture reports were usually negative for this organism. The mean number of days elapsing between delivery and the onset of infection was three, and there seemed to be a tendency for clinical signs to occur somewhat later in spontaneously delivered as contrasted with operatively delivered patients.

2. *Duration of Fever.*—It will be noted from Table XX that approximately one-fourth of the cases of clinical puerperal infection have a

DISCUSSION

It will be seen from the graphs of the material obtained at the Chicago hospital, that there is a considerable difference in the white and negro in some of the measurements. In the external conjugate there is very little difference, the negro averaging about 0.25 centimeter less than the white. When the other measurements are considered, however, a decided difference between the two races can be seen. This averages about 0.5 cm. As stated before, this is more easily seen in the cumulative curves than in the frequency curves.

The graphs from the Memphis hospital show the same tendencies. It would therefore seem that there is a decided difference in certain external measurements in the white and in the negro. This has been found true by other writers also (Riggs, Williams).

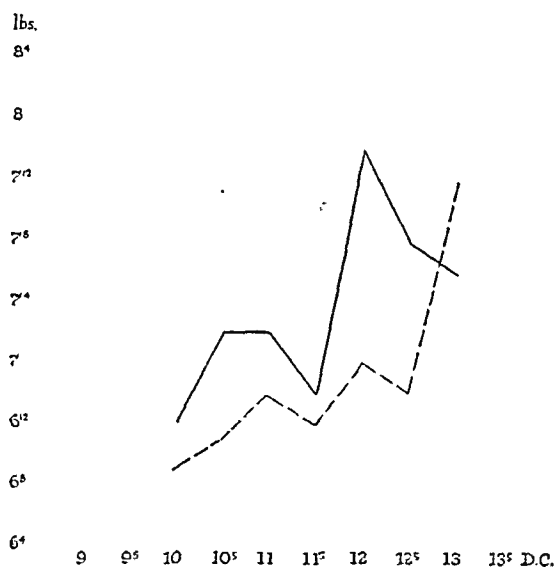


Fig. 6.—Graph showing comparative weights of newborn at the Memphis Hospital: white (solid lines) negro (broken lines).

In the compilation of internal measurements, only the Memphis data can be used since, unfortunately, they were not given in the Chicago records. Those from the Memphis hospital show that the internal diameters of the negro are smaller than those of the white. The transverse shows a uniform difference of about 0.5 cm. The diagonal conjugate is about 0.75 cm. less, while the anteroposterior shows little difference.

As a result of this difference in size, it would seem probable that the negro would have a much harder labor than does the white. This is the case. Jardine in his studies has found that while labor in savage races is comparatively easy, it becomes harder if the child is a half-breed, since the heads of children of civilized races are larger. Comparing the graphs of the measurements of the negro and the white infant head, it was found that there was little difference in size.

content of the lochia was studied. Table XXII indicates the results obtained according to the type of organism involved. It will be noted that despite clinical indications of intrauterine infection the report in 12 per cent of the total was either "diphtheroids alone" or "no growth." It is our feeling that better technic in carrying out the anaerobic studies would reduce these two groups to a considerable extent. The hemolytic streptococcus was present in 5 per cent of the cultures obtained from patients delivered spontaneously and 7 per cent in operative deliveries,

TABLE XXII. PER CENT OF TOTAL CULTURES

ORGANISM	F. T. S.	F. T. O.	TOTAL INCLUDING PR.
α hemol. strep.	0.91	2.35	1.23
β hemol. strep.	4.09	4.71	4.92
Aerobic nonhemol. strep.	17.73	31.76	21.54
Anaerobic strep.	52.27	36.67	47.69
<i>Strep. viridans</i>	0.00	1.18	0.31
<i>Staph. albus</i>	27.73	31.76	28.62
<i>Staph. aureus</i>	0.91	1.18	0.92
<i>B. coli</i>	4.55	9.41	5.54
Gonococcus	1.36	0.00	1.23
<i>B. welchii</i>	0.45	1.18	0.62
Unidentified bacteria alone	0.45	1.18	0.62
Diphtheroids alone	5.45	3.53	4.92
No growth	7.73	5.88	7.08

while some type of streptococcus was found in 75 per cent of the total cultures. It is interesting to note the higher incidence of aerobic non-hemolytic streptococci and also *B. coli* in the group of operative deliveries as contrasted with spontaneous. No particular effort was made to culture the gonococcus, which accounts for the low incidence of this organism.

5. *Some Differences Observed Between Infections with the Hemolytic, Aerobic Nonhemolytic, and Anaerobic Streptococcus.*—Table XXIII is included in order to demonstrate certain essential differences in the cases of puerperal infection according to the type of streptococcus involved. It will be seen that a marked racial difference existed. Three-fifths of the hemolytic streptococcus infections occurred among white patients, while only one-third and one-quarter of the cases due to the aerobic non-hemolytic and anaerobic streptococcus, respectively, were in the white

TABLE XXIII

ITEM	HEMOLYTIC STREP.	AEROBIC NONHEMOL. STREP.	ANAEROBIC STREP.	TOTAL INFECTION SERIES	TOTAL NORMAL SERIES
White	60.00%	33.87%	25.00%	38.40%	53.60%
Black	40.00	66.13	75.00	61.60	46.40
Primiparas	65.00	75.81	68.24	72.66	55.36
Multiparas	35.00	24.19	31.76	27.34	44.64
Mortality	10.00	0.00	1.35	1.28	0.00
Spontaneous	65.00	66.13	79.73	68.99	80.72
Operative	35.00	33.87	29.27	31.01	19.28

2.4 per cent and 2.1 per cent, respectively. There were then 7.8 per cent operative births and 92.2 per cent spontaneous births among the white. Among the negroes there were 4.55 per cent operative births and 95.45 per cent spontaneous births. These figures are approximately 11 per cent higher for spontaneous births than those reported by Riggs twenty years ago. In a series of 1,500 cases he reported 80 per cent of the white and 84 per cent of the negro births spontaneous. His operations also included besides low forceps, version and extraction, midforceps, high forceps, craniotomy, basiotrypsy, accouchement forcé, and cesarean section.

Injuries to the mother were found to be infrequent, which is undoubtedly due to the lack of interference and conservative treatment given.

CONDITION OF CHILD AT BIRTH

The percentage of serious conditions and stillbirths is much higher in the negro than in the white. While this may be due partly to syphilis, it ought not to be entirely responsible, since most of the patients are treated in the out-patient department before entering the hospital.

SUMMARY

1. There is little difference between the negro and the white in the external conjugate, but the other measurements show considerable difference, the negro being smaller.

2. The internal diameters show variation, the negro being smaller, commensurate with the external diameters.

3. The diameters of the patients in the Memphis Hospital were smaller proportionally than those in the Chicago Hospital.

4. Labor in the negro is more difficult than in the white due at least in part to the size and hardness of the infant's head, although there is little actual difference in the size of the negro and white infant head. Since, however, the birth canal in the negro is smaller than that of the white, the head is relatively larger. The negro head is harder to mold than is the white.

5. Pelvic measurements alone are not sufficient indication for cesarean section. No cesarean sections were performed in the Memphis Hospital though some cases were within the limits of absolute indication. The cases in which cesarean section was performed in the Chicago Hospital were for indication in addition to pelvic measurements.

6. There was little other operative interference, the spontaneous births ranging from 95.45 per cent to 80 per cent.

7. Injuries to the mother were few in number.

8. Abnormal conditions of the child and stillbirths were much higher in the negro than the white.

section have been omitted. The purpose of the comparison was to elicit factors in the patient and her labor which would seem to predispose toward the development of a subsequent intrauterine infection. The following are some of the factors adduced:

1. The incidence of operatively delivered patients was much higher in the group with puerperal infection than in the normal series.

2. Puerperal infection occurs much more frequently in black than in white women, and this difference is significantly greater with spontaneous than with operative delivery.

3. Women in the earlier years of their childbearing careers, and also primiparas, are more predisposed to intrauterine infection than those of the older age groups and multiparas.

4. The time of admission to the hospital in terms of duration of labor seemed to play no part in a subsequent infective process.

5. The incidence of rupture of the membranes prior to admission to the hospital was almost three times as high in the group of patients who later developed a puerperal infection as contrasted with those whose subsequent course was normal. Rupture of the membranes occurring more than twelve hours before delivery seemed definitely to predispose the patient to infection, and our analysis indicated that premature rupture of the membranes either before the onset of pains or early in labor was of little import provided delivery was consummated within the above time period.

6. Vaginal examination, as employed whenever necessary to corroborate or amplify rectal findings, carried no added danger to the patient.

7. The duration of labor, both in primiparas and multiparas, in terms of the first and second stages, was significantly longer in the group of infected patients as contrasted with the normal puerperium series. Depending upon parity and type of delivery the mean duration in the two groups varied from one to ten and one-half hours and was persistently higher in the infection series.

8. The incidence of perineal tears or episiotomies was slightly higher in the infected group, but the number of cervical lacerations of sufficient extent to warrant immediate repair was three times as great.

9. The amount of blood lost subsequent to delivery was significantly greater in the infected as contrasted with the normal group and the incidence of postpartum hemorrhage (600 c.c. or more) 10.67 and 4.21 per cent for the two series, respectively.

10. Intrapartum infection (temperature during labor 100.4° F. or above) was observed almost four times as frequently in the infected as in the normal group.

11. Intercurrent disease, particularly syphilis, pyelitis, and respiratory infection, was a complicating factor much oftener in those patients with subsequent intrauterine infection.

must surely suffer from the absorption of such a poison as nicotine, which would exert a deleterious influence upon their health.

These observations prompted a review of the literature and stimulated some experimental work on animals with a view of determining, if possible, the effect of nicotine poisoning on the female sex organs.

Hofstätter,¹ a review of whose extensive writings on this subject is most illuminating, discusses reasons why women smoke. He states that heavy smokers start because they are unhappy and that in some instances they are disappointed in their sex life, and that smoking is a reaction against certain thwarted desires. He suggests that they smoke to exhibit a certain freedom and independence and believes that the enjoyment is not a direct one but that it comes from more abstract impulses and that it offers the opportunity for theatrical, and easily assumed, charming, and graceful movements and positions. He thinks that women make more studied movements and make a more formal procedure of smoking than men; he suggests that smoking is done to avoid boredom, that it is a flight from reality, and intimates that in many instances it is a habit associated with odor, watching the blue smoke, and the accompanying movements of the hands, mouth, and respiratory organs. He concludes, however, that the most important reason is a desire for psychic becalming, or narcomania.

I think it is a general observation that few women smoke excessively who are busily and happily occupied and that idleness plays an important rôle in the causation of this habit.

A review of the literature made a year ago² indicates that there has been a limited amount of research work done on animals to determine the effect of nicotine poison on their female sex organs and that the conclusions which have been reached have not been concordant.

For example, Ogata,³ in 1919, observed no apparent changes in the ovaries of rabbits after injecting them with a tobacco filtrate, while Hofstätter found that after injecting dogs, guinea pigs, and rats, repeatedly, the sex function was lessened and follicular development was inhibited.

Unbchan,⁴ in 1931, after injecting white mice with nicotine, concluded that with hardly any exception an unfavorable influence resulted on ovarian function, that a cessation of the estrus resulted, and that a degeneration of the ripening follicles occurred with increase in follicular atresia and increase in connective tissue.

Nakasawa,⁵ in 1933, observed that after injecting female rats with nicotine the sex cycle was changed, atrophy of the ovary, uterus, and tubes resulted and that a continuation of the nicotine produced sterility because it stopped the menstrual cycle. He injected a group of rats during pregnancy, and while they did not abort, the offspring were weak and died easily.

Sodano,⁶ refers to the discordant viewpoints of various authors upon the influence of tobacco upon women who are employed in this industry. He states some observers hold that the lesions of the female genital apparatus in tobacco workers are due to other extrinsic conditions and not to tobacco intoxication, and that the statistical researches conducted in France some years ago showed that tobacco workers exhibited no difference in birth rate and abortion than women employed in other industries.

Sodano claims that nicotine does not act immediately upon the ovaries as does lead and some other toxic substances, but that it produces a disturbance of the function of the thyroid gland which, in longer periods of intoxication, is followed by glandular

DÜHRSSSEN'S INCISIONS

AN ANALYSIS OF 592 CASES

ARTHUR B. HUNT, M.D., ROCHESTER, MINN., AND
WILLIAM B. MCGEE, M.D., SAN DIEGO, CALIF.

(From the Chicago Lying-In Hospital and the Department of Obstetrics and Gynecology, The University of Chicago)

ONE of the most trying dilemmas encountered in obstetric practice is with the patient, who after many hours of active labor, presents urgent indications for delivery but presents an incomplete dilatation of the cervix. Cesarean section usually is not merited because there is no actual bony disproportion or is contraindicated by frank or potential infection.

Manual dilatation of the rigid cervix now is branded as "manual tearing" and is condemned because of dangers of trauma and hemorrhage with morbidity both immediate and remote. Dührssen's incisions constitute a clean surgical procedure and would reasonably be expected to lessen these hazards.

Dührssen,¹ who first put cervical incisions during labor on a sound basis as an operative entity, performed his first operation on Nov. 10, 1887. He readily granted priority for the procedure of incising the cervix,^{2,3} but justly insisted on the originality of his practice of making multiple deep incisions to the vaginal fornix, and virtually effecting the conditions of complete dilatation by surgical means. Many of the earlier writers allude to the use of this incision as a last resort.⁴⁻⁹ Launergat¹ and Skutschio (1887) made more extensive use of it.

The use of clamps (Zweifel), broad retraction (DeLee), incision at points in the cervix corresponding to 10, 2, and 6 on the clock, and careful suture of the incisions constitute technical improvements. Cervical dystocia in the elderly primiparas rather than eclampsia was Dührssen's earlier indication but eclampsia was later his prime indication; weak pains were not an indication. Careful asepsis and all the benefits of a complete maternity hospital and an emphatic warning against a careless conscience in its usage was urged.

Dührssen's series¹ of 31 cases was the largest published until Shirie reported 162 cases. Olow,¹¹ Cathala,¹² Roscal,¹³ Mathien and Schaufliker,¹⁴ Randall,¹⁵ and others have commented on the procedure and reported small, scattered series of cases in the last two decades.

Five hundred and ninety-two cases in which Dührssen's incisions were done, occurred at the Chicago Lying-In Hospital from 1917 until November, 1932, during which time slightly less than 40,000 confinements are recorded. Thus the incidence of the operations is 1.48 per cent. This incidence is high, but it was promoted by the ideas of forestalling serious effects of marked maternal exhaustion and the preservation of the fetus.

of nicotine on their sex organs. These experiments covered a period of over nine months. Dr. German's report is as follows:

Two normal female rabbits for a period of over nine months had been receiving injections of a solution of nicotine both subcutaneously and intravenously. The intravenous dose consisted of 1 c.c. of a 1:1,000 solution of the drug. This throws the rabbit into an immediate violent convulsion. The subcutaneous dose was 4 c.c. and was sufficient to produce a more prolonged type of clonic convulsion. These rabbits have withstood the treatment very well and have gained weight. One rabbit was subjected to fertilization. She went through a normal pregnancy and delivered a litter of normal rabbits, all of which died prematurely. The inoculations of nicotine averaged 3 per week over a period of nine months, at the end of which time both rabbits were sacrificed. Ovaries and uteri were examined histologically and no changes could be demonstrated which were not within physiologic limits.

In interpreting the reports of the experimental data of research work done by others to which we have had access, it is our opinion that there is indisputable proof that nicotine produces in some way certain histologic changes in the ovaries of rats, mice, and guinea pigs, and that it also interferes with normal maturation of the follicles. Furthermore, it would appear that these changes are sufficient to produce sterility and to cause changes in the menstrual habits and sex characteristics of the above animals. It also seems certain that the offspring suffer and sometimes die from the effects of nicotine on lactation.

The experimental work with two female rabbits carried out for a period of over nine months by Dr. German indicates that nicotine produces no changes in the sex organs of these animals nor does it impair their reproductive efficiency.

Recently I submitted the following questions to the members of this association: In your opinion does the smoking and inhalation of twenty-five or more cigarettes daily have an unfavorable effect upon maternal health? Seventy-five replies were returned: 63, or 84 per cent, answered the question with "yes"; 2, or 2.66 per cent, answered the question with "no"; 5, or 6.66 per cent, answered: "I do not know"; 2, or 2.66 per cent, answered the question with: "Only in the case of individual susceptibility"; 3, or 4 per cent, answered the question with: "No definite opinion."

Some of the remarks accompanying answers to this questionnaire were of interest. Royston feels that excessive cigarette smoking interferes with a well-balanced diet, inhibits desire for normal physical activity, and seems to dull the sensibilities, while others are apparently not affected.

Barney reports the case of a baby a week postpartum who had developed a severe case of nicotine poisoning from the mother's milk, the mother having smoked two packages of cigarettes a day.

Davis finds that women who are heavy smokers are much more nervous than the average of his patients.

Cornell reports the case of a baby who was four weeks overdue, with a birth weight of less than four pounds, who showed all the signs of drug withdrawal, and in whom pediatricians thought nicotine was the cause.

The patient should have received the advantage of proper supportive treatment in the first stage of labor. The uterus regains strength, effective pains return, and the cervix dilates spontaneously in many cases of prolonged labor with proper administration of food, fluids, and rest. This course is always to be preferred to operative means, all things being equal. Forty per cent of patients in this series did not receive a sedative hypodermic and of the remaining 60 only 20 received more than one. Such supportive therapy should logically be a part of what is called watchful or "intelligent" expectancy. Intelligent expectancy is by no means synonymous with hopeful procrastination. A normal spontaneous delivery often occurs or at least a less dangerous operative one becomes possible after such management.

Supportive therapy during the first stage should not be so delayed that the patient's condition will not permit of trial. The patient cannot be safely left in labor without the benefit of foods, fluids, and rest. Obviously all cases are not solved by administering fluids and rest; if dehydration and exhaustion with perhaps fever and a rapid pulse develop after thirty-six or forty-eight hours of labor, operative methods are usually soon required.

One must also make certain that the patient is really in active labor. As Horner¹⁷ states, "Even after long observation of the patient one may be deceived. It is often difficult to denote the time of transition from false into true labor pains." Regularity of the contractions of adequate strength and duration with progressive dilatation of the cervix are about the only criteria of active labor.

Persistence in inducing labor with a long, closed, firm, stubborn cervix before it has become softened and partially effaced almost invariably results in a long troublesome labor before complete dilatation is finally reached. Operative deliveries often follow such a course whereas if the patient has been treated with a sedative she might return to the hospital in a day or week in spontaneous active labor and deliver normally with relative ease. This contention is supported by the fact that 16.4 per cent of these patients received mechanical induction as compared to an incidence of 3.8 per cent during the past year for all cases, an incidence four times as high. Possibly some of these patients might better be subjected to laparotrachelotomy where the indication for termination is urgent. This applies especially to those with some appreciable pelvic disproportion, the membranes not too long ruptured, the patient not potentially infected. The woman runs a slightly higher risk, possibly, but the genital tract is not so severely or permanently traumatized and the baby's outlook is immeasurably better than after a difficult forceps operation.

Last, in placing the indication for Dührssen's incisions, as in all surgical procedures, the individual case should be pondered carefully. One

It would probably be fanatical to state that all women should abstain from smoking, but I believe that it is a responsibility of every physician to warn the young women of this country of the dangers which attend excessive indulgence and of the susceptibility of many to the toxic effect of nicotine, even in a moderate use of cigarettes.

Physicians should particularly interest themselves in the question of smoking among young girls during the period of adolescence, at which time this habit may easily produce endocrine imbalance, and at which time self-control, a proper attitude toward matters pertaining to sex, and the development of normal maternal instincts should progress without interruption.

It is my conviction that excessive cigarette smoking has a degenerating influence in many ways upon every woman and that it is prejudicial to her highest efficiency as a sweetheart, a wife, or a mother.

One objection to excessive smoking in women is the difficulty they experience in controlling the habit when they become pregnant. A number of them admit that they cannot limit their smoking during pregnancy in spite of the fact that they are conscious of the unfavorable symptoms produced by it. At the present time I have under observation an expectant mother who frankly admits that she cannot limit her smoking to less than a package of cigarettes a day, although she admits that they affect her unfavorably, and notwithstanding the fact that she has been advised as to their possible unfavorable effect on her child. Another young woman who could not control her excessive smoking during the prenatal period was warned postnatally that unless she smoked very moderately the baby might suffer from nicotine poisoning, and she promptly weaned the baby rather than even moderate her smoking.

So far as the clinical symptoms are concerned which arise from excessive smoking or from susceptibility to nicotine, there is no doubt whatever that nearly all of the important functions of the body are to some extent disturbed by it, and physicians should endeavor to evaluate properly its influence and specifically advise each patient who insists on smoking according to her sensitivity to it.

CONCLUSIONS

1. Excessive smoking and inhalation of cigarettes is incompatible with the highest ideals of maternal health.
2. Absorption of nicotine in some way produces definite histologic changes in the ovaries of rats, mice, and guinea pigs which results in some instances in sterility and unhealthy offspring.
3. Physicians should inquire more closely concerning the smoking habits of their female patients, a number of whom are susceptible to nicotine.

Rupture of the lower uterine segment should not be overlooked, though none serious enough to warrant hysterectomy occurred in this series. It is surprising how well these unrepaired incisions often heal. In event of an extension of the incision, Allis clamps placed high on the edges of the wound may expose the apex or a traction suture high in the wound may facilitate the closing of the top portion of the extension.

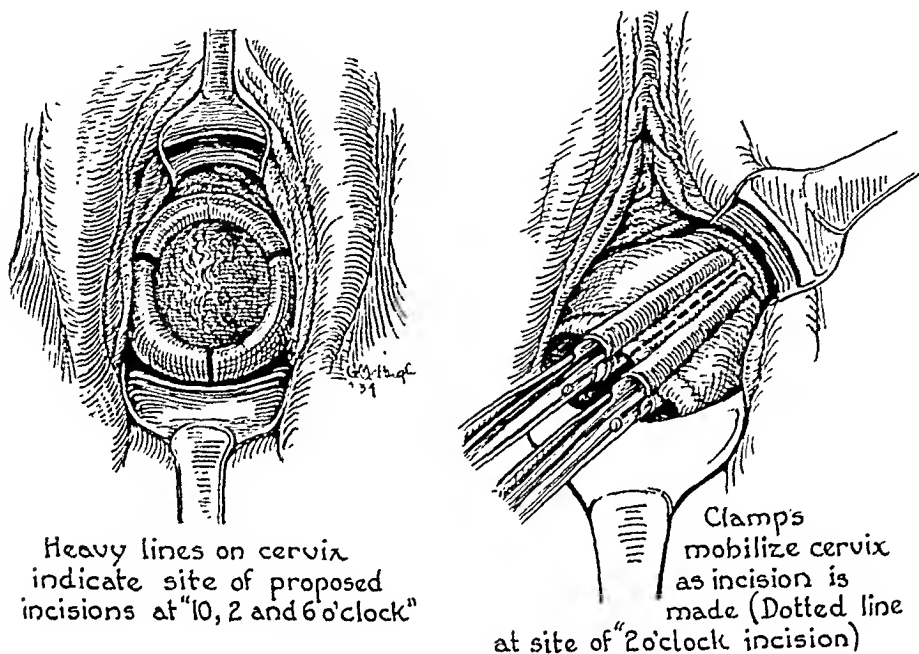


Fig. 1.

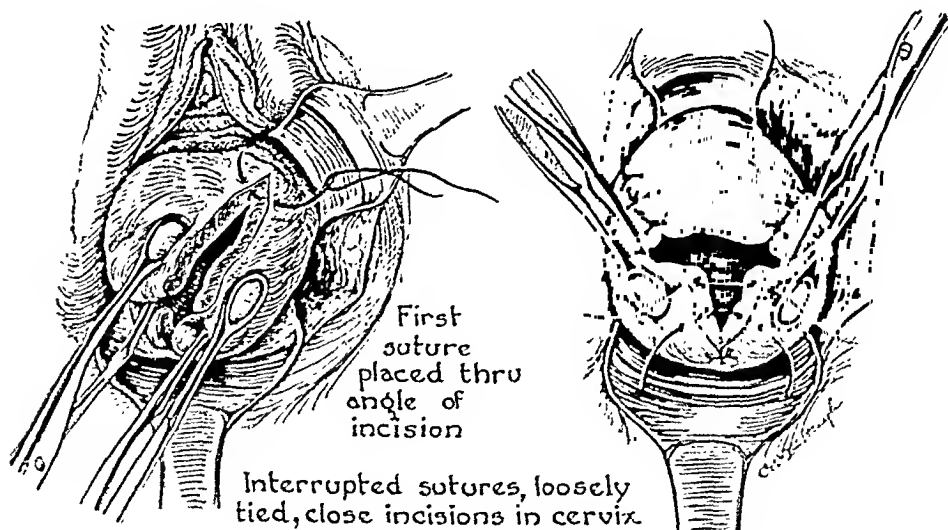


Fig. 2.

Care should be taken to evert the tissue at the upper angle of the wound or poor union will result.¹⁰ Two to four sutures of number two, twenty-day, chronic catgut are used to carefully approximate each wound, avoiding the endocervix (Fig. 2).

Speed in the repair of the cervical incisions and episiotomy wound is imperative not only to save blood, but also because the patient has undergone a long labor and an operative delivery with prolonged anesthesia.

The Dührssen's operation may be done under local parasacral anesthesia, if indicated.¹¹

in the experimental laboratory that the estrogenic hormone causes the uterine irritability and painful contractions, and that corporin is antagonistic to the action of the estrogenic substance, becoming the quieting factor.

We have confined corporin therapy to a definite class of dysmenorrhea patients. This type has been found to have normal genital development and placement; in other words, patients with infantile genital development, cervical stenosis and improper drainage, ovarian abnormalities, or other extragenital conditions which might cause the periodic pain, were excluded from this series of cases.

The dosage of corporin administered was placed at a therapeutic level found to give relief; daily subcutaneous doses of 5 to 8 rabbit units were administered five days prior to the onset of the periodic bleeding. Preparations were used in both oil and alcoholic solutions. Some reddening of the skin was noted at the site of the injections a few hours after. Patients did not complain of pain. No abscess formation or serious reactions were observed at the site of the injections. There were no general systemic effects.

It is of paramount importance that all patients were submitted to thorough physical examinations. Laboratory work included a complete blood count, urinalysis, blood Wassermann, a basal metabolic test and blood calcium if symptoms warranted them. Many well-known hygienic measures were not forgotten as corrective factors; these measures were advised at times to the exclusion of glandular treatment. Emphasis must be placed upon the fact that the cases to be reported show nothing of importance in their general physical examination and laboratory check-up in relation to their periodic pain.

Five cases are to be briefly reported without the detailed physical and laboratory findings since the latter add nothing of importance to this report.

Miss S., aged twenty-two years, white female, newspaper reporter. Chief complaint was dysmenorrhea since onset of periods, which was colicky in type, requiring patient to go to bed for the first day of flow. Onset at twelve years, twenty-eight-day type, five-day flow and moderate in amount. First series of injections of five doses of 8 rabbit units gave slight relief but patient did not go to bed. Second monthly series of five doses of 8 rabbit units gave marked relief and very little pain. The third series of a similar dosage gave complete relief; and the fourth series produced the same result as to relief with the flow increased. Patient was then allowed to go for two months without any treatment and during this time she had two periods unaccompanied by pain. The follow-up treatment in this case has been intermittent. Results may be classified as excellent.

Miss M., aged eighteen years, white female, sophomore in college. Chief complaint dysmenorrhea since onset of periods requiring bed rest the first forty-eight hours of flow. Periods were colicky in type, thirty-day interval, profuse flow with clots, and no intermenstrual bleeding. First series of injections 5 doses of 6 rabbit units gave "50 per cent relief" as stated by the patient. Second series of 5 doses of 8 rabbit units gave marked relief with only slight pain. The third series, 5 doses of 8 rabbit units gave complete relief without premonition of the onset of flow.

The average duration of ruptured membranes was 19.5 hours.

Presentation and Position.—It must be stressed that the diagnosis of position and presentation was made vaginally in each instance and checked at delivery and therefore furnishes accurate data. It represents a fairly large series of obstetric cases wherein the diagnosis is surely known.

Only 16.9 per cent were occipitoanterior, 31.4 per cent were occipitotransverse and 48.8 per cent, or nearly one-half, were occipitoposterior positions. If the occipitoanterior position is considered as normal, then 83 per cent of these cases had an abnormal position. Thirty-four breech presentations were encountered, a percentage of 5.8 per cent, or nearly twice the normal incidence.

Indications.—General indications for Dührssen's incisions have already been discussed (Table I). As labor drags on further and further beyond the length that has been called average, a multiplicity of untoward findings are likely to appear, often suddenly. Thus in this series it very frequently occurred that more than one indication arose; for example, in 152 cases there was a combined fetal and maternal indication mentioned.

It is interesting to note that there was dystocia from the scars of previous Dührssen's incisions in only two cases of this series.

Number of Incisions and Extensions.—Three incisions should be distinctly preferred as a prophylaxis against either extension of incisions or lacerations during the instrumental delivery which usually followed the incisions. Consequently, a correlation was made between the incidence of cervical lacerations or extensions

TABLE I

<i>Fetal Indications:</i>		
Irregular or failing F. H. T.		137
Meconium in cephalic present		40
Prolapsed cord		25
Malposition of fetus		5
(Maternal or not listed)		211
<i>Maternal Indications:</i>	COMBINED	ALONE
Exhaustion	206	104
No progress	196	93
Cervical dystocia	115	46
Preeclampsia	49	23
Uterine inertia	26	15
Transverse arrest	18	6
Progressive edema	19	6
Eclampsia	15	12
Cardiac decompensation	11	0
Tetanic uterus	5	2
Bandl's ring	21	6
Persistent occiput posterior	4	3
Placenta previa	3	2
Abruptio placentae	3	0
Fetal indications combined with maternal ind.	152	
Fibroids		4
Toxic thyroid		4
Vaginal bleeding (undiagnosed)		3
Anterior parietal presentation		4
Face presentation		3
Previous cesarean section		3
Previous Dührssen's incisions		2
Previous anterior suspension		1
Brow presentation		1
Uterine prolapse		1
Uremic or eclamptic coma		1
Severe vomiting five days with acidosis		1
Acute psychosis		1

A COMPARISON OF DIFFERENT METHODS FOR MEASURING RENAL FUNCTION DURING PREGNANCY

R. H. FREYBERG, M.D., JAMES L. GILLARD, M.D., AND FERDINAND
GANESBAUER, M.D., ANN ARBOR, MICH.

*(From the Department of Internal Medicine and the Department of Obstetrics and
Gynecology, Medical School, University of Michigan)*

DURING recent years numerous tests of kidney function have been developed. In general, each of these tests belongs to one of three types: (1) a measure of the ability of the kidneys to concentrate and dilute urine, (2) a test of the efficiency of excretion of catabolic waste products, and (3) a measure of the elimination by the kidneys of a foreign substance introduced into the body. The value of tests representative of each of these types in different clinical states has recently been discussed by one of us.¹

The purpose of this communication is to report the results of a study of the comparative value of three different tests of renal efficiency during pregnancy.

METHODS

Kidney function was measured in a series of forty-eight cases of pregnancy. Most of the patients studied showed no abnormality during the course of their pregnancy; a small number had definite toxemia. In most of these patients kidney function was measured by each of the following methods: the Lashmet-Newburgh concentration test,^{2, 3} the Van Slyke and Cope blood urea clearance test,⁴ and the fractional phenol-sulphonaphthalein excretion test as described by Chapman and Halstead.⁵ Thus a test representative of each of the above mentioned types was employed.

The following values have been considered by the originators of the various procedures as normal. During a concentration test the nonprotein specific gravity* of the urine should reach 1.029 or higher. Normal urea clearance values range from 75 to 125 per cent; values above 125 per cent are considered as evidence of hyperfunction of the kidneys; values below 75 per cent, as indicating impairment of renal function. During the first fifteen minutes of the fractional phenolsulphonaphthalein test, 28 per cent or more of the injected dye should be excreted.

Since this report deals only with comparative results of these three procedures, no discussion of clinical findings or classification of the toxemias will be entered into.

*Throughout this article the concentrating ability of the kidneys is reported as the maximum nonprotein specific gravity of the urine.²

quently. For the last several years this has been the practice when indicated and is one reason for the greatly improved mortality statistics in the last half of this series.

Many of these patients were, theoretically at least, candidates for postpartum hemorrhage by virtue of such so-called predisposing factors as long labor, deep anesthesia, large babies, etc. Radical management of the third stage was often necessary. The placenta was delivered spontaneously by external pressure in 311 cases, but 125 placentas were manually removed, many incidental to manual ex-

TABLE II

<i>Entire Series—570 Cases</i>		
Average blood loss	389 c.c.	
500 c.c. or over	161 Cases	28.2%
<i>First 100 Cases</i>		
Average blood loss	539 c.c.	
500 c.c. or over	50 Cases	50.0%
<i>Last 100 Cases</i>		
Average blood loss	310 c.c.	
500 c.c. or over	14 Cases	14.0%

ploration of the genital tract to detect or rule out serious damage to maternal soft parts, such as rupture of the lower uterine segment. Uterine tamponade was employed thirty-seven times. Facts relevant to hemorrhage are seen in Table II.

Correlation of Thickness of Cervix to Blood Loss.—It was an especial point of interest to prove or refute the universally expressed idea that incision of a thick cervix invites dangerous hemorrhage. A review of the cases revealed that the blood loss was only slightly in excess in the cases of thick cervix, compared with those cases where the cervix was thin or well-effaced. The average blood loss for both groups was less than in the total series. Greater blood loss was incurred from incising an edematous cervix, as a tabulation of hemorrhage from seventy-nine cases with edema of the cervix showed an average blood loss of 407 c.c. (Table III).

TABLE III. CORRELATION OF THICKNESS OF CERVIX TO BLOOD LOSS

Average blood loss for 570 cases	389 c.c.
Average blood loss 367 cases with "thin" cervix	372 c.c.
Average blood loss 93 cases with "thick" cervix	383 c.c.
Average blood loss for 79 cases of edematous cervix	407 c.c.

Morbidity.—From the nature of these cases one could predict an unfavorable incidence of morbidity. Over one-half of the patients (51.4 per cent) showed a febrile morbidity of 100° or more (DeLee), 23.2 per cent by the British Standard, and 14 per cent by the Strassburg Standard. Table IV shows an effort to correlate etiology with morbidity. It is obviously often difficult to point out a tangible cause for infection in most of these cases. Therefore two tables of morbidity were compiled; one wherein there was a sole probable etiologic and another where there was a combination of one or more possible etiologic factors. Postpartum hemorrhage was the greatest single offender. It is of especial significance to emphasize that not a single death occurred from sepsis. One patient who died of abruptio placentae immediately after delivery had an intrapartum temperature with one chill.

Table V compares the morbidity of these cases with 2,808 consecutive cases in the hospital for one year, and also with 148 cases of delivery subsequent to Dührsen's incisions.

The immediate fetal morbidity was high but usually not serious if condition at discharge from the hospital is taken as the criterion. There were injuries such as scalp and facial bruises, facial palsy, deep forceps marks, and "asphyxia," but they were almost universally transient.

DISCUSSION

It has been shown by Van Slyke and his coworkers,⁶ and others, that the total two-hour phenolsulphonophthalein excretion shows impairment

TABLE II. RESULTS OF THE DIFFERENT TESTS OF RENAL FUNCTION IN CASES WITHOUT MEASURABLE RENAL DAMAGE. DYE EXCRETION WAS DETERMINED FROM VOIDED URINE.

PATIENT	MONTH OF PREGNANCY	CONCENTRATING ABILITY SP. GR.	UREA CLEARANCE PER CENT	P.S.P.	
				15-MIN. PER CENT	2-HOUR PER CENT
M. L.	2½	1.029	86	35	78
L. K.	2½	1.030	86	28	72
F. W.	8	1.032	126	30	67
M. K.	8½	1.031	77	28	78
M. K.	9	1.035	140	32	68
J. W.	9	1.032	137	35	77
E. T.	9	1.029	120	37	74
E. H.	7	1.029	92	17	62
F. D.	8	1.029	120	13	72
T. B.	8	1.035	115	18	79
M. W.	8	1.035	100	13	81
V. B.	8	1.031	79	17	65
A. B.	9	1.030	112	9	85
B. M.	9	1.030	103	19	45
E. S.	9	1.029	83	6	50
M. T.	9		113	14	68
B. A.	9		100	25	71
L. L.	9		109	8	59
H. M.	9		105	15	65
H. M.	Postpartum			30	

TABLE III. COMPARING THE FIFTEEN-MINUTE DYE EXCRETION DETERMINED FROM VOIDED URINE AND FROM URINE OBTAINED BY CATHETER

PATIENT	MONTH OF PREGNANCY	UREA CLEARANCE PER CENT	PHENOLSULPHONOPHTHALEIN EXCRETION		
			15-MIN. URINE VOIDED PER CENT	15-MIN. URINE BY CATHETER PER CENT	2-HOUR TOTAL PER CENT
B. A.	8	100	25	23	71
J. R.	9	130	24	17	77
M. E.	9	99	23	19	92
L. M.	9	134	21	20	80
I. M.	9	82	21	22	
M. M.	9	108	31	24	75
C. W.	7	133	19	22	66
M. K.	8	110	16	19	67
R. S.	9	94	13	30	63
V. A.	9	109	8	19	93
M. F.	9	79	8	4	78
F. P.	9	88	8	10	54

of renal function only when the kidney damage has become extensive and severe. Stander⁷ has found that the two-hour phthalein test is of no value in cases of mild kidney damage during pregnancy. This fact is well demonstrated by the data shown in Table I. In each of these

Protocols of Maternal Deaths.—CASE 1.—(No. 8250) Patient, Aug. 7, 1919, aged twenty-one, gravida i, para 0, four weeks overterm, cervix effaced, 8 cm. dilated, meconium in fluid. Delivery was by Dührssen's incisions and easy low forceps. Took anesthesia poorly, became cyanotic, physical findings of aspiration, dead of pulmonary edema two hours and thirty-five minutes after delivery.

Diagnosis: Aspiration pneumonia. Anesthetic death. Autopsy denied.

CASE 2.—(No. 6087) Patient, Feb. 6, 1918, aged thirty-seven, gravida ii, para i, 5 cm. dilated after fifty-five hours labor. The patient went into shock during mid-forceps operation after Dührssen's incisions and died in thirty minutes. There was no hemorrhage or rupture of the uterus.

Diagnosis: Anesthetic death, no autopsy.

CASE 3.—(No. 12073) Patient, May 16, 1920, aged eighteen, gravida i, para 0. The patient suddenly went into shock near the end of a midforceps operation and promptly died. Ether anesthesia two hours. Estimated blood loss 350 c.c. Autopsy revealed: (1) Enlarged thymus, mesenteric lymph glands, and Peyer's patches; (2) pulmonary edema; and (3) bladder and uterus intact. No blood in peritoneal cavity.

Diagnosis: Thymic death ? or obstetric shock.

CASE 4.—(No. 16802) Patient, aged thirty-five, gravida ii, para 0. Multiple pregnancy. In labor thirty-five hours, dehydrated, febrile, one chill. Typical signs of abruptio placentae appeared, delivered by forceps for the first and version and extraction for the second twin. Profuse postpartum hemorrhage, estimated 1400 c.c.

Diagnosis: Abruptio placentae with intra- and postpartum hemorrhage.

CASE 5.—(No. 25459) Patient, Oct. 27, 1922, aged thirty-six, gravida i, para 0. Rheumatic endocarditis since age eleven, with subacute bacterial endocarditis with decompensation in pregnancy. Spontaneous onset of labor at twenty-eight weeks. Ran typical course for the disease and died of cardiac failure on the thirty-eighth day postpartum. Autopsy showed normal genitalia, typical vegetation of mitral and aortic valves, and infarctions of the spleen and kidneys.

Diagnosis: Subacute bacterial endocarditis.

CASE 6.—(No. 25973) Patient, aged twenty-nine, gravida ii, para i. Moderate toxemia. Delivery by high forceps after Dührssen's incisions. Postpartum hemorrhage of 600 c.c. controlled. The patient left the delivery room in good condition with a pulse of 85 and of good quality. She went into shock soon after reaching her room and died in one hour in spite of treatment. No autopsy was granted but exploration of the uterus showed it empty and clean with no rupture.

Diagnosis: Toxemia of pregnancy, vasomotor collapse, obstetric shock.

CASE 7.—(No. 44374) Patient, Aug. 1, 1925, aged thirty-nine, gravida i, para 0, entered the hospital with a blood pressure of 218/128. The urine gave a reaction of 4+ albumin and contained many hyaline and granular casts and red and white blood cells. The patient very soon passed into deep coma and was delivered by Dührssen's incisions and midforceps of a viable baby that survived, but she did not respond to therapy and died in seven and one-half hours. Autopsy was denied.

Diagnosis: Eclamptic or nephritic coma.

Fetal Mortality.—Sixty-one babies were lost either by stillbirth or as neonatal deaths in the hospital giving a percentage of 10.3, which compares favorably with the figure of Shir (13 per cent). Correction for monstrosity, babies under 1,500 gm., and macerated fetus (18 cases), gives a mortality of 7.7 per cent.

It is impossible to give an accurate statement of fact as to the number of babies saved. In approximately 150 patients evidence of fetal distress was deemed

SODIUM AMYTAL AND MORPHINE IN LABOR

ISIDORE DAICHMAN, M.D., AND MARTIN M. SHIR, M.D., BROOKLYN, N. Y.

(From the Obstetric Service of the Kings County Hospital)

IN 1934, while studying the comparative value of sodium amytal, sodium amytal and seopolamine, the Gwathmey method, and avertin, we found that sodium amytal and seopolamine gave the most satisfactory results as far as analgesia and amnesia were concerned. However, the most serious objection to this combination of drugs was that about 40 per cent of the patients were quite restless, sometimes requiring one-fourth grain of morphine. With the thought of eliminating the restlessness we gave to each of 13 patients from $\frac{1}{12}$ to $\frac{1}{8}$ gr. of morphine with 9 gr. of sodium amytal. We found this dosage of morphine insufficient.

Ninety-one women in labor were given 9 gr. of sodium amytal by mouth and $\frac{1}{6}$ gr. of morphine by hypodermic. At the time the drugs were given the patient was usually having four- to five-minute pains and the cervix was from 2 to 3 fingers dilated. Sixty-four were primiparas and 27 were multiparas. Seventy-eight patients required no more than the initial dose. Eight received an additional 6 gr. of sodium amytal each. Three received an additional 6 gr. of sodium amytal and $\frac{1}{6}$ gr. of morphine. Two patients were given $\frac{1}{4}$ gr. of morphine to control restlessness. When additional relief is required late in the first stage, 6 gr. of sodium amytal alone will usually be sufficient. Earlier in the first stage, additional relief may be procured by giving an additional 6 or 9 gr. of sodium amytal and a second dose of $\frac{1}{6}$ gr. of morphine.

It takes about twenty minutes for the drugs to take effect. After this period of time, however, the patient goes to sleep. She may or may not wake up and moan with each pain, but as soon as the pain is over, she falls asleep again. A few of our patients sat up and complained or squirmed about during the pains, but fell asleep as soon as the pains subsided. The effects lasted from four to six hours.

Analgesia was considered good when the patient had complete relief during pains and rested well between pains. It was considered fair when the pains were only partially relieved, and poor when the pains were slightly or not at all relieved. Ninety out of 91 patients had good or fair analgesia.

Amnesia was considered good when the patient remembered absolutely nothing about her pains or delivery. It was considered only fair when she remembered very little, and poor when she remembered a good deal about her pains and delivery. Of our 91 patients, 46 or 50 per cent had either good or fair amnesia.

One woman died as the result of a complete abruptio placentae (0.62 per cent maternal mortality). Eight babies were lost (5 per cent) but when corrected for monstrosity, previability (under 1,500 gm.), and macerated fetuses, there remains only the 1 fetal death from the severe abruptio placentae which also cost the mother's life.

The blood loss and morbidity were both gratifyingly low. The average estimated blood loss for 145 patients was 246 c.c. Table VI shows the distinctly afebrile morbidity, definitely lower than the average for the entire series.

Subsequent Condition of the Cervix.—Table VIII presents important data relevant to local outcome of the operation on the cervix. Nearly one-half of the patients left much to be desired from the surgical repair of the cervix. It was surprising to notice how many patients presented adhesions to the vaginal fornix from deep cervical scars.

One must not expect too much from the cervix in these cases. It is usually traumatized and often edematous or infected before the operation is begun. A multiparous cervix entirely devoid of all lacerations is a rarity. A good functional result, not anatomic perfection, is all that should be expected.²¹

Unfortunately, the occurrence of troublesome leucorrhea was not studied in specific detail. It did occur, but not with great frequency. In the unsatisfactory cases with poor healing, much good can be done in the way of clearing up a bad cervix

TABLE VIII

CERVICAL RESULTS	NUMBER OF CASES	PER CENT
Well healed	95	54.5
Poorly or not healed	18	10.4
Deep scars	33	19.1
Adhesions to fornix from deep scars	27	15.6
	173	
<i>Repeated Labors</i>		
Well healed	17	37.7
Deep scars	21	64.7
Required repair	7	15.5
	45	

by careful use of the actual cautery or silver nitrate. These cases should be followed until healing is complete. Such is our present practice and results are proving it well worth the time and effort.

The value of the baby in the specific case must be weighed carefully against the possible subsequent danger the mother or fetus may suffer from the operative delivery, and also the chance for the fetus if left to a spontaneous delivery or low forceps after complete dilatation and descent of the fetal head. The ultimate social value of some of these infants subjected to premature operative delivery may, we feel, be questioned because of trauma inflicted, even though in no patient did this appear evident on discharge from the hospital.

SUMMARY AND CONCLUSIONS

1. Dührssen's incisions offer a rapid surgical method to complete the dilatation of the cervix when urgent need for delivery arises, and when the cervix is the only obstructing factor.

2. Careful placing and timing of the indication in the individual case is required. Careful supportive therapy directed to forestall or treat the deleterious effects of exhaustion and dehydration will lessen the

lessness has been reduced from 33.3 per cent and 39.6 per cent to 2.2 per cent. Amnesia, however, has been reduced from 67.9 per cent (for the sodium amytal and scopolamine group) to 50.5 per cent. The number of asphyxiated babies has apparently increased, but it should be noted that in over half of these cases, the drugs were given rather late in the first stage. Another point to keep in mind is that the asphyxiated babies are easily resuscitated. No baby has been lost due to the use of the drugs. Analgesia was good or fair in 98.7 per cent of the cases.

SUMMARY AND CONCLUSIONS

In our first publication we were not very enthusiastic about sodium amytal because of the high incidence of restlessness, the frequent use of forceps, and the high percentage of asphyxiated babies. In our second paper we pointed out that sodium amytal and scopolamine seemed to be superior to sodium amytal alone, to the Gwathmey method, and to avertin as far as analgesia, amnesia, and asphyxiated babies were concerned. Here, too, we called attention to the very high incidence of restlessness (39.6 per cent) as a serious objection.

Sodium amytal and morphine, in the dosage mentioned, gives 98.7 per cent of good and fair analgesias, only 50.5 per cent of good and fair amnesias; but the restlessness has been cut down to 2.2 per cent. The percentage of asphyxiated babies is 8.7. The patients are cooperative in the second stage and there is no increase in operative deliveries due to the drugs used. We do not wish to make extravagant claims for this particular combination of drugs or for any of the barbiturates, but we do believe that the marked reduction in the restlessness and the greater cooperation in the second stage are distinct improvements and are worthy of being brought to your attention.

REFERENCES

- (1) Shir, M. M., and Daichman, Isidore: AM. J. OBST. & GYNEC. 24: 115, 1932.
- (2) Daichman, Isidore, Kornfeld, G., and Shir, M. M.: AM. J. OBST. & GYNEC. 28: 101, 1934.

1325 UNION STREET

Rossi, Domenico: Defloration Without Coitus, Clin. ostet. 37: 421, 1935.

Criticizing a medicolegal expert in a case of presumed digital defloration, the author demonstrates the usual incompetency of the expert regarding gynecologic matters and, with Garfami, laments the fact that still too frequently medicolegal problems of a delicate nature are entrusted to physicians lacking in specific knowledge concerning such problems.

AUGUST F. DARO.

12. The end-results of cervical healing are excellent in slightly over one-half of the cases, but somewhat disappointing in the remainder. Careful follow-up therapy with the cautery or silver nitrate will usually leave a clean cervix.

13. Except for a small minority of about 4 per cent, which must not be overlooked, the labors of subsequent pregnancies are quite uneventful as regards cervical dystocia. In fact, they seem to deliver with greater ease and safety than the average obstetric patient, providing cervical obstruction was the cause of the dystocia in the first labor.

14. Dührssen's incisions leave no increased tendency toward abortion, miscarriage, ectopic pregnancy, or reduced fertility.

REFERENCES

- (1) *Dührssen, A.*: Arch. f. Gynäk. 44: 413, 1893. (2) *Idem*: Arch. f. Gynäk. 37: 27, 1890. (3) *Idem*: Surg. Gynec. Obst. 2: 259, 1906. (4) *Burns, Lowes*: Principles of Midwifery, 1823, Edward Parker Co., p. 428. (5) *Velpeaux*: Midwifery. Translated by C. O. Meigs. John Grigg Co., Philadelphia, 1831. (6) *DeWees, Wm. P.*: A Compendious System of Midwifery, Philadelphia, 1932, Carey & Lea, p. 358. (7) *Smith, W. Tyler*: Parturition and the Principles and Practice of Obstetrics, Philadelphia, 1849, Lea & Blanchard. (8) *Simpson, Sir J. Y.*: Selected Obstetrical and Gynecological Works, Edited by S. Watt Black, New York, 1871, D. Appleton & Co., p. 10. (9) *Schroeder, Karl*: A Manual of Midwifery. Translated by Charles H. Carter, New York, 1873, D. Appleton & Co., p. 222. (10) *DeLee, J. B.*: Principles and Practice of Obstetrics, ed. 6, Philadelphia, 1933, W. B. Saunders & Co. (11) *Olow, J.*: Gynec. et Obst. 1: 131, 1920. (12) *Cathala, V.*: Gynec. et Obst. 1: 113, 1920. (13) *Roscal, M.*: Bull. de la Soc. d'Obst. et Gynec. 16: 390, 1928. (14) *Mathieu, A., and Schauflyer*: AM. J. OBST. & GYNEC. 16: 390, 1928. (15) *Randall, L. M.*: AM. J. OBST. & GYNEC. 25: 873, 1933. (16) *Shir, Martin M.*: AM. J. OBST. & GYNEC. 26: 425, 1933. (17) *Horner, A. D.*: Surg. Gynec. Obst. 44: 194, 1927. (18) *Adair, F. L.*: Personal communication. (19) *DeLee, J. B.*: Dührssen's Incisions, Motion Pictures. (20) *Tucker, B. E., and Benaron, H.*: AM. J. OBST. & GYNEC. 27: 850, 1934. (21) *DeLee, J. B.*: Personal communication.

Tietze, K.: Follicle Persistence and Glandular Hyperplasia of the Endometrium, Arch. f. Gynäk. 155: 525, 1934.

Tietze reports his studies of 466 patients seen during the last ten years in the Kiel clinic. In all of these patients there was follicle persistence and glandular hyperplasia of the endometrium, a condition usually described as metropathia hemorrhagica. The author points out the comparative frequency with which these conditions are found at the beginning and the end of the period of sex activity, i.e., at puberty and at the menopause.

In the differential diagnosis of this condition, all other types of acyclic vaginal hemorrhage must be ruled out, namely incomplete abortion, endometritis, polyps, submucous fibroids, and carcinoma of both the cervix and the fundus. Various forms of hyperplasia following pregnancy and the various types of hemorrhages found in connection with this condition are discussed. Anatomic studies of the endometrium, myometrium and of the ovaries are described and the author states that large cystic granulo-a-bearing follicles were found in all but one patient. As a result of this, hyperplasia of the endometrium, the myometrium and the endocervix was almost universal. The hyperplastic endometrium was undoubtedly the source of the hemorrhages.

of a temporary sterilizing dose. "Late" conception is that which takes place after the end of the temporary amenorrhea. He states that the common view is that phenotypic and perhaps genotypic injury is possible in the case of early conception, whereas in late conception the ovum would recover completely before it is capable of being fertilized.

Wintz mentions 500 children born to women after temporary sterilization in whom no phenotypic injuries were observed. He states that the experiments of H. J. Muller with banana flies which pointed toward injury of the genes constituted early and not late fertilization and, he adds, that experiments with mammals carried to the F6 generation showed no injury.

Nürnberg in 1930, after careful analysis of experimental data on the *Drosophila*, concluded that breeding which is done more than fourteen days after radiation of the flies is not followed by any effect on subsequent generations.

Timofeeff-Ressovsky in 1931 reported that the results of his experimental study with the *Drosophila* tended to deny the existence of any pronounced after effect of x-ray radiation on mutability.

Little and Bagg described four anomalies which appeared as recessive hereditary characteristics in x-rayed mice; unfortunately no mention was made as to the time interval between x-ray treatment and breeding. There were probably early fructifications. It would seem that there is a good opportunity to repeat this work, comparing the effects on the genes by breeding at varying time intervals after x-ray treatment of the mice.

Bonnevie, working with the strain of Little and Bagg x-ray mice, concluded that the whole group of anomalies were a manifestation of action of one recessive gene cooperating with a series of other genes, or groups of genes, modifying this effect. She notes that the effect on this gene causes an augmentation of the cerebrospinal fluid due to formation of embryonic blebs.

Hanson and Hayes, using the *Drosophila*, present evidence that the beta particle of radium is the effective agent in gene change and they add "these results apply to x-rays as well as radium." If this be so it would seem profitable to repeat the experiments of Little and Bagg using only gamma radiation, both for early and late impregnations.

It has been noted that there is a tendency toward abortion in the first pregnancies following radiation treatment whereas later pregnancies are more often normal. It seems likely that in many of the early cases abortion is caused by the disease of the uterus or adnexa for which treatment was instituted or by the effect of radium on the generative organs themselves rather than as the direct effect upon the fetus.

Archangelsky listed the possible mechanisms by which the fetus itself is damaged during pregnancy:

1. By direct effect on the fetus itself, especially the blood-forming organs, lymphatic tissue, endocrine glands, and central nervous system.
2. By indirect effect on uterine musculature and endometrium.
3. By indirect effect on the ovary.
4. By indirect effect on the fetus caused by formation of leucotoxins. (Massive doses of x-radiation applied to carcinoma at a distance from the pelvic organs have apparently produced death of the fetus, microcephaly and other typical lesions of radiation damage.)

color, but on bisection the ordinarily white walls appeared a light tan. After being placed in a specimen jar, the tan gradually became darker and the formalin solution assumed the same color.

Unstained frozen sections made from the fresh specimen showed here and there some brownish opaque material in small clumps, but its relation to the surrounding tissues could not be determined. In paraffin sections stained with hematoxylin-eosin, silver deposits were not discernible, but they became visible when the sections were stained only lightly with alum carmine and examined under high power. Very fine black dots were seen chiefly in the musculature of medium and large-sized vessels and also throughout the musculature of the uterus. In the multiple squamous epithelium of the cervix they were entirely absent; neither could they be found in the subepithelial tissues, and only very occasionally was a black dot discovered in one of the papillae. A few lumina of the cervical and uterine glands were seen surrounded by a fine black line, but as a whole the endometrium was free. The oil immersion lens, finally, showed these black particles to be either very small, fairly



Fig. 1.—*Argyria uteri*. Section through uterine muscle, very faintly stained with alum carmine. The entire field appears darkened, owing to the wide distribution of extremely fine, dustlike black particles throughout the tissues (best seen with oil immersion). Connective tissue and elastic fibers appear as wavy black lines upon which fine granules can be seen arranged in rows here and there. In the walls of arteries and veins larger granules are visible. Note, in particular, the presence of such granules within the contents of the veins in the left lower and right upper corner.

even-sized granules or extremely minute dustlike deposits scattered diffusely throughout the myometrium. Nowhere were any signs whatever of a foreign body reaction in the form of leucocytes, lymphocytes or giant cells.

These findings were presented and the patient was demonstrated before a local medical society, but the publication of the case was delayed for extraneous reasons. Now that the uterus has been in the hardening solution for more than a year, the specimen has turned a very dark, almost black color. New sections made present a much clearer picture which is represented in Fig. 1. The deposits are now much more numerous and better defined. Connective tissue and elastic fibers appear black, and with the oil immersion finest granules can be seen upon them like beads on a string. A fine black line separates the endothelium in many of the arteries from the media; within the latter and at their periphery there are other granules. In the veins larger granules are easily seen at the periphery and also among the blood

- "2. If conception occurs, pregnancy must be interrupted on eugenic grounds for one cannot know that the genes have not been injured.
- "3. If a fetus in utero is irradiated the pregnancy must likewise be interrupted on eugenic grounds."

Nürnbergger discusses these warnings, indicating the encouragement they give to damage suits of various kinds. He agrees with Wintz that patients should be warned against early conception, admitting the possibility of fetal damage in this group as indicated by the work of Oskar, Gunther, and Paula Hertwig, though no proof of such action in the human being has been brought forward. Wintz pointedly remarks in this connection that all diagnostic as well as therapeutic irradiation in the region of the male or female sex glands would have to be given up if the warning of the two German Societies were strictly heeded.

Any study calculated to show the presence or absence of the effects of radiation on the genes would necessitate the compilation of a large number of very carefully reported cases and family histories.

Maurer proposed that such information should be assembled at some central institution and that follow-up examination of the children should be secured every three years, and he gives an outline of significant information which should be gathered as completely as possible to accompany each case report. In addition to the usual history and physical examination of the child which is supposed to have been subjected to the effects of radiation, one should indicate the physical and psychic deviations from normal as compared with older siblings.

SUMMARY

It seems reasonable to advise that the use of radium and x-ray during pregnancy for treatment purposes be restricted to very clear and urgent indications, and that the use of diagnostic x-ray examinations be not too frequently repeated during pregnancy.

In view of the resolutions of the two German societies, it would seem wise, as Nürnbergger suggests, that physicians using radio-active agents for the production of temporary amenorrhea should make written records warning the patient and her husband against early subsequent pregnancies and that these warnings should be acknowledged in writing.

It seems advisable to interrupt any pregnancy which has been subjected to therapeutic radiation, for it is generally admitted that serious radiation effects on the offspring will result in a high percentage of cases. These effects are proportional to the amount of radiation and are more serious in early pregnancies, though the fetus may be seriously injured at any stage of development.

It is to be hoped that no opportunity will be lost to place on record any significant case which shows the effect of radiation on the human offspring together with sufficient data to make the report useful. Cases of carcinoma of any part of the body which are treated during pregnancy with survival of the child are of particular value.

REFERENCES

- Ancl and Wolff*: Compt. rend. Soc. de biol. 112: 798, 1933; abst. Am. J. Dis. Child. 49: 1632, 1935. *Apert, E., and Lichtenberg*: Bull. Soc. de pédiat. de Paris 31: 306, 1935; abst. Am. J. Dis. Child. 49: 1632, 1935. *Archangelsky, B.*: Arch. f. Gynäk. 118: 1, 1923. *Bailey, H., and Bagg, H. J.*: Am. J. Obst. & Gynec. 5: 461.

scription of former observers. She also had ieterie sclerae and darkened conjunctivae; further ophthalmologic examinations were not made but I infer from the literature that the internal parts of the eyes may likewise be affected. The gums, as a rule, remain free while the teeth may exhibit a dark greenish brown tint. The nails, as in my patient, are of that dark gray color which usually appears after death, and there are cases on record where the hair of the head had assumed a yellowish red hue,⁶ and added a still more phantasmal touch to the startling picture. As regards inner organs, Petri¹² supplies several colored illustrations which demonstrate the dark appearance of the intestinal mucosa; and it will be remembered that in my case, the uterine musculature exhibited a distinct yellowish brown discoloration.

Our knowledge of the finer histologic processes in chronic silver poisoning which dates back to the publication by Frommann,² in 1859, has been obtained from biopsies and from postmortem examinations of which I have been able to find only 13 instances in the literature.^{2, 4} In all of these 13, conditions other than chronic silver poisoning were the causes of death. In these examinations, all organs have been subjected to careful study, but as all previous reports dealt with male patients, this, as far as I could ascertain, is the first time that the uterus has become available for study.

All observers agree that the silver deposits produce no reaction whatever in the tissues, and my case bears out this contention. The silver granules seem to have a particular predilection for connective tissue and even more markedly for elastic fibers. Whether this is due to some sort of chemical affinity or whether these fibers act as filters, has not yet been determined. At any rate it is along the bundles of collagenous and elastic fibers, but not *within* epithelial cells that the granules group themselves in the form of rows.⁴ Petri¹² notes in particular that in the heart muscle the granules cover the sarcolemma as a dense sheet. The distribution of these deposits is most dense where the blood supply is particularly abundant as seen, for instance, in the glomeruli of the kidney. My findings of granules *within* the venous blood stream well illustrate this point. In contradistinction to other writers,^{4, 14} who described rows of granules in the connective tissue underlying secreting epithelium, I found but few such deposits in the neighborhood of glands. Once deposited in tissues, the silver becomes permanently fixed, and apparently no part of it is excreted. It has been suggested that the silver nitrate is first changed into silver albuminate, then dissolved, and finally reduced to metallic silver.

the rectum subsequently went through pregnancy. In 1926 Katz and Kaspar² presented a critical summary of 18 cases of carcinoma of the rectum relating to pregnancy, and they also included an excellent bibliography on this subject. This field of inquiry has more recently been discussed in the communications of Katz,³ Tagliaferro⁷ and Mengert.⁸

The case here reported illustrates the innocuous course of two pregnancies following abdominoperineal resection of the rectum and permanent colostomy.

Mrs. L. W. (Unit No. 42.) The patient was a twenty-five-year-old American housewife who entered the Strong Memorial Hospital on Oct. 1, 1931, with a complaint of bloody mucoid stools of five months' duration. For years she had been constipated, requiring active cathartics. During the last of her four pregnancies, all of which ran normal courses, the constipation was particularly distressing. There was, however, no recognizable bleeding until shortly after the delivery of her last child. She also had had small external hemorrhoids but these caused her little trouble and no bleeding. Her weight had fallen from 128 to 119 pounds in three months. Her past medical history included diphtheria, chickenpox and mumps in early childhood, and influenza at the age of thirteen. There had been no recent symptoms referable to the cardiorespiratory, genitourinary or locomotor systems. There was no family history of carcinoma or of rectal trouble. General physical examination was essentially negative save for the presence of a fungating mass that could just be felt on rectal examination. Laboratory findings: Blood: Hb. 70 per cent; R.B.C., 3,500,000; W.B.C., 9,900 on which the differential count was normal. Wassermann, negative. The urine was negative except for a faint trace of albumin. The stools gave a strongly positive reaction to benzidine. A barium enema showed redundancy of the sigmoid but no obstruction or fixation in the colon. On proctoscopy a large purplish polypoid mass was seen about 8 cm. inside the anus. Biopsy showed an invasive epithelial growth rich in mitoses, definitely establishing the diagnosis of carcinoma of the rectum. Radical abdominoperineal resection of the rectum was performed in one stage by Dr. W. J. Merle Scott on Oct. 30, 1931. The tumor was an adenocarcinoma 6 cm. in diameter which almost completely encircled the lumen of the bowel about 3 cm. below the rectosigmoid junction. There was no definite evidence of metastasis to the peritoneum, mesenteric lymph nodes, or liver. The posterior surface of the uterus contained roughened fibrinous areas presumably resulting from a previous inflammatory process. Using the cautery, the colon was divided just below the sigmoid, and the proximal end brought out just lateral to the left rectus abdominis muscle as a permanent colostomy. The distal portion of the bowel was dissected out of its bed and away from the cervix and vagina, and the site of dissection was covered over with peritoneum from either side. After closure of the abdomen, the patient was placed in the perineal position and the rectum removed intact by dissection through the para-anal skin, the perineal and levator ani fasciae and muscles. The patient made an uneventful recovery and was discharged from the hospital on Dec. 11, 1931, forty-three days after the operation. The perineal wound healed promptly and the colostomy functioned in a satisfactory manner.

On June 12, 1933, about nineteen months following the operation, the patient was again seen, this time in the prenatal clinic. At this time she was some six months pregnant. Her general condition had been good and her pregnancy was uncomplicated by albuminuria, edema, hyperemesis, or elevated blood pressure. The colostomy was giving her no trouble. The patient fell into labor and was admitted to the hospital on July 30, 1933. The fetus lay in the transverse position and rotated so that the breech presented. This in part was doubtless a contributing factor to the prolonged labor of some twenty-four hours. Shortly after the rupture of the membranes, the cord prolapsed. Breech extraction was promptly performed because of fetal cardiac distress. The perineum offered little resistance and the skin and mucous membrane at the outlet remained intact. The child, a male, weighing 2,390 gm., was

REFERENCES

- (1) *Becker and Ritchie*: J. A. M. A. 97: 389, 1931. (2) *Frommann*: Virchows Arch. 17: 135, 1859. (3) *Gellhorn*: Surg. Gynec. Obst. 51: 484, 1930. (4) *Goettler, Rhoads and Weiss*: Am. J. Path. 3: 631, 1927. (5) *Graham*: Dublin Med. Press, p. 243, 1843. (6) *Hirschberg*: Zentralbl. d. prakt. Augenheilk. 33: 71, 1909. (7) *Knack*: Deutsche med. Wehnschr. 58: 1672, 1932. (8) *Kober and Hanson*: Dis. of Occupation and Vocational Hygiene, Philadelphia, 1916, Blakiston, p. 580. (9) *Koelsch*: Muenchen. med. Wehnschr. 59: 304, 1912. (10) *Lundy*: Illinois M. J. 63: 173, 1933. (11) *Myers*: Am. J. Syph. 7: 125, 1923. (12) *Petri*: Path. Anat. u. Histol. d. Vergiftungen, ed. by Henke und Lubarsch 10: 48, 1930. (13) *Reuter*: Muenchen. med. Wehnschr. 81: 355, 1934. (14) *Royster*: J. Pediat. 1: 736, 1932. (15) *Stillians and Lawless*: Arch. Dermat. & Syph. 17: 153, 1928. (16) *Thompson*: Occupational Diseases, New York, 1914, D. Appleton-Century Co., p. 229. (17) *Woodward*: Am. J. Dis. Child. 45: 1046, 1933.

METROPOLITAN BUILDING

VARYING PATTERNS OF DRIED BLOOD SERUM OF WOMEN

JOSEPH T. SMITH, M.D., CLEVELAND, OHIO

(From the Department of Obstetrics and Gynecology of Western Reserve University and the Maternity Hospital)

DUNOUY, and later V. Bergauer, Boučik, and V. Podgrouzěk¹ show that when diluted blood serum, taken from women at different periods in the menstrual cycle, is dried on slides, the salt crystals deposited take different forms. These authors claim that such different patterns are not due to chemical changes. The albumin-globulin content of the serums was tested by Robertson's refraction method. No differences were detected, and the addition of globulin and cholesterol to the serums had no effect on the dried patterns deposited. No changes in the concentration of hydrogen ions could be found.

These authors are of the opinion that the difference in the patterns depends upon the hormone content of the serums. The patterns could be altered by the addition of extracts of thyroid, ovary, or hypophysis. It is the theory of these writers that the hormones in the blood influence the electrolytic condition of the serum, and hence affect the form of the salt crystals deposited on drying.

The authors describe three types of patterns which we illustrate in the accompanying plates photographed from our own specimens. Fig. 1 shows the "bastioned" type, which shows a single sodium chloride crystal surrounded by a ragged rampart of more irregular débris and crystals, looking, under the low power of the microscope, like the ground plan of a fortification. This type of figure is said to be characteristic of serum taken within less than a week after a menstrual period. Fig. 2 presents the single crystal surrounded by concentric rings, of a "cut onion" appearance. This is supposed to be the type

A REPORT OF TWENTY-TWO LATZKO CESAREAN SECTIONS WITH A MODIFICATION IN TECHNIC

HARLAN B. PERRINS, M.D., NEW HAVEN, CONN.

ON THE fifteenth of November, 1927, the following case was admitted to my service at Grace Hospital:

Mrs. E. B., aged twenty-two, primipara, had been in labor four days at home under the care of a midwife. A number of vaginal examinations had been performed. Her membranes had ruptured at the outset of labor. Upon examination, the patient was found to have a normal temperature, and was moderately exhausted. She had a generally contracted pelvis; the position was L.O.P. with a floating head and marked overriding. A laparotrachelotomy with performed with no unusual findings and no difficulties were encountered with the exception of rather free bleeding due to uterine inertia. The patient left the operating room in good condition. Twelve hours after delivery she showed the typical signs and symptoms of a general peritonitis and died of this condition five days later.

Possibly better judgment would have been used if a Porro cesarean section or at least extraperitonealization of the uterus had been done, but the absence of evidence of real infection prior to operation led me away from these two rather drastic procedures.

This case brought home to me, however, the great need for a procedure which would eliminate the danger of causing peritonitis at the time of operation due to contaminating the peritoneum with spill.

In the June issue of the *AMERICAN JOURNAL OF OBSTETRICS AND GYNECOLOGY* of 1930, the two articles by Steele and Burns discussing indications, technic and results of Latzko section, appeared to me to be the answer to the problem.

Since that time it has been my privilege to perform twenty-two Latzko cesarean sections, which I wish to report at this time, with a slight modification in the technic as described by Burns which I have found helpful in this operation. All of these patients have been sufficiently exposed to contamination of the vaginal tract to make the possibility of peritoneal soiling a real one in the event of any intra-peritoneal operation. With one exception, none of these patients was sufficiently infected as to warrant as radical a procedure as an extraperitonealization of the uterus or a Porro cesarean section.

The twenty-one cases which did not show gross infection are outlined in Table I.

is more characteristic of the premenstrual period; and we also observed it frequently in male controls, in pregnancy, and in the post-

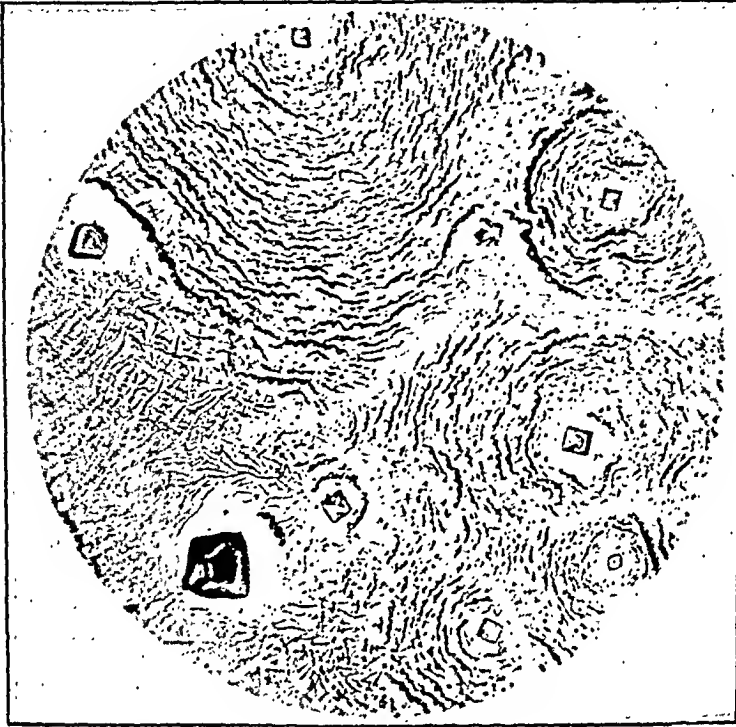


Fig. 3.—Interrupted rings. Premenstrual.

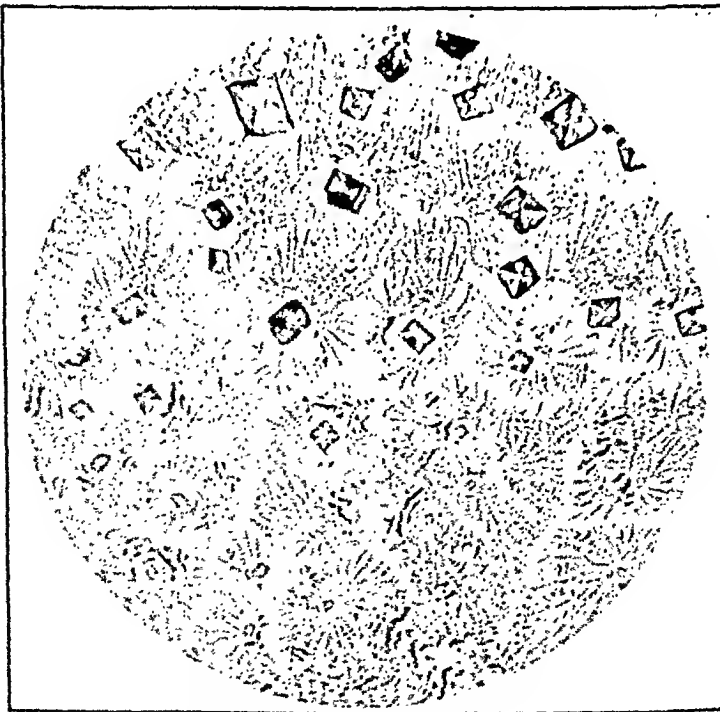


Fig. 4.—Pellant. Premenstrual, male, pregnancy.

partum period. Fig. 5 shows larger asters than does Fig. 4; a condition we have found in toxemias and eclampsia.

TABLE I—CONT'D

	DATE	NAME	AGE	GRAVIDA	INDICATIONS	MORBIDITY	NUMBER OF HOSPITAL DAYS
13	3/25/35	M. V.	21	i	Generally contracted pelvis with disproportion. Membranes rupt. 2 wk. 4 hr. of labor	None	14
14	4/25/35	E. M.	26	i	Cervical dystocia. 24 hr. labor. Membranes rupt. 24 hr. Head floating. Vaginal exams.	3 days	15
15	5/14/35	C. G.	26	i	Justomino pelvis with disproportion. 30 hr. labor with vaginal examinations	10 days	18
16	8/ 2/35	D. DeC.	25	i	36 hr. labor. 18 hr. 2nd stage with head barely engaged. Membranes rupt. 48 hr.	3 days	14
17	8/ 5/35	R. L.	23	i	40 hr. labor. No progress for 10 hr. with head barely engaged. R.O.P. Cervix 4 f. dilated. 9 vaginal exams.	None	14
18	8/16/35	T. S.	30	iii	2 normal deliveries of small babies. Generally contracted pelvis. Large baby. Absolute disproportion. 18 hr. labor with rupt. membranes. Patient was filthy dirty on admission and home sanitation very questionable	None	14
19	8/15/35	C. A.	32	i	40 hr. labor. 48 hr. rupt. membranes. Patient exhausted. No progress for 6 hr. R.O.P. Head well engaged but high. Cervix 4 f. dilated. Patient refused difficult vaginal delivery	None	14
20	8/27/35	M. D.	27	i	Borderline pelvis. 40 hr. labor. Unengaged Breech. Membranes rupt. at onset of labor. Many vaginal examinations	None	14
21	8/29/35	J. E.	21	i	Cesarean in interest of fetus. Premature partial separation of placenta. Membranes rupt. Unaccountable temp. of 102°. 20 hours labor	6 days	14

tent, and if hormones do increase in amount during pregnancy and in toxemia, we thought it would be interesting to test bloods from pregnant women. Through the kindness of Dr. Arthur H. Bill, we have been able to do this with patients from the dispensary and wards of the Cleveland Maternity Hospital. As Table I indicates, the results have not been uniform, but the blood pattern in normal pregnancy seems to fall most frequently into Class IV, while the toxemias and eclamptics tend to Type V, of large asters.

TABLE I

	POSTMENSTRUAL; DAYS				PREGNANCY		TOX.	ECLAMP.	MALE CONTROL
	1-7	7-14	14-21	21-28	1ST HALF	2ND HALF			
Type I "Bastioned"	3								
Type II Ringed	2	6							
Type III Interrupted ring	6	9	6	3	2	2	1		
Type IV Radiant	3	4	9	3	1	8	1		5
Type V Large asters	1					2	5	3	

CONCLUSIONS

1. Dried drops of diluted blood serum from women show the deposited crystals arranged in at least five different patterns.
2. The predominant type in pregnancy and the toxemias is either Type IV or V, and unlike that seen in the case of most nonpregnant women in the early postmenstrual days.
3. The patterns are not consistent enough to be very reliable for diagnostic purposes, but they may aid in evaluating the amounts of circulating hormones.

I wish to express my gratitude to Dr. E. E. Ecker, of the Western Reserve Medical School, for important assistance in this work.

REFERENCES

- (1) *Les Travaux*: de l'institut d'hygiene publique l'etat Tchecoslovaque, July, 1934. (2) *Frank, Goldberger*: *Proc. Soc. Exper. Biol. & Med.* 32: 1664. (3) *Hofbauer*: *AM. J. OBST. & GYNEC.* 26: 311, 1933.

16515 CARNEGIE AVE.

had left the peritoneum adherent to the rectus muscle, and once for no obvious reason other than a very delicate peritoneum. In each case the rent was repaired and the operation continued.

2. The bladder was opened once, was immediately recognized and repaired. No retention catheter was used and no special care was given postoperatively as far as the bladder was concerned.

There were no untoward results in any of these cases and the patients made uneventful recoveries.

Certain points were noted in this series of cases:

1. These patients showed decidedly less shock and less postoperative disturbance than intraperitoneal cases in spite of the potential infection present.

2. The hospital stay was not lengthened.

3. The morbidity was certainly no greater than in other cesarean sections and not at all in proportion to similar cases in which laparotomies had been done.

4. The technic of operation, while definitely more difficult than either classical or low flap cesarean sections, is not sufficiently difficult to warrant its avoidance by a capable operator in any patient whose chances can be improved by the operation.

From this short series I have drawn the following conclusions:

1. Latzko cesarean section fills a very definite gap between the laparotomy and the more radical extraperitonealization of the uterus and Porro cesarean although in no way replacing these proceedings in their indicated cases.

2. The lack of shock and the smoothness of the convalescence warrant a widening of the indications for this operation.

I wish to express my deep appreciation to Dr. Arthur H. Morse for his constructive criticisms.

REFERENCES

Burns: AM. J. OBST. & GYNEC. 19: 759, 1930. Steele: AM. J. OBST. & GYNEC. 19: 747, 1930. Burns: AM. J. OBST. & GYNEC. 28: 552, 1934.

Guthmann, H., and Neuhaus, W.: With What Certainty Does the Sedimentation Test Determine Inflammatory Disease of the Genitalia, *Monatschr. f. Geburtsh. u. Gynäk.* 98: 157, 1934.

The authors performed 1,892 sedimentation tests on 1,138 patients to determine the value of this test in patients with inflammatory adnexa. Leucocyte counts were made at the same time, and it was found that the leucocyte count gave more reliable information in the acute stages whereas the sedimentation test was of greater value in the subacute and chronic states. Since the sedimentation test demonstrates changes for a longer period of time than the leucocyte counts, it is of greater benefit in cases of genital infections.

J. P. GREENHILL.

In regard to the lymph gland metastases Taussig has made a wonderful contribution by his lymphadenectomy and interstitial radiation. He reports over 61 per cent of Group II patients living and well from one to three and a half years. In these patients he found carcinomatous lymph glands in 44.4 per cent. Without this additional operative therapy his percentage of cures would probably have been reduced by one-half.

Since Feb. 1, 1933, to June 1, 1935, we have admitted to Kings County Hospital 131 cases of carcinoma of the cervix. Of these there were 68 or 52 per cent which were so hopeless that no therapy was attempted. There were 29 or 22 per cent of advanced clinical Group IV cases in which palliative therapy was attempted. There were 19 or 14 per cent of clinical Group III cases, 16 or 9 per cent of clinical Group II, and 4 or 3 per cent clinical Group I cases.

Of these we have used abdominal interstitial radiation with radon seeds in nine cases, following our usual local cervical and uterine radiation with radium and an intensive cycle of roentgen therapy.

Radon seed implantation in metastases was done in three cases. Lymphadenectomy with seed implantation in three cases. One patient had abdominal seed implantation, interstitial needle implantation in the cervix, followed a few months later with seed implantation in the cervix, and finally, fifteen months after the original treatment by abdominal hysterectomy and lymphadenectomy, and implantation of seeds in solid metastases against the pelvic wall. This patient was operated upon Sept. 9, 1935, and the outcome of her case cannot be reported. The reason for the hysterectomy was a persistent radio-resistant growth on the cervix, and the formation of metastases while receiving intensive roentgen therapy.

The case of our first patient treated by seed implantation in a metastasis will be reported in detail.

Mrs. M. A., aged forty-nine, para iv, was admitted to St. John's Hospital Aug. 31, 1931, with a history of vaginal bleeding for two and a half months. The growth covered the whole cervix and the uterine canal was not patent. Biopsy revealed an epidermoid carcinoma. She was given 4,800 mg. element hours of radiation. This was followed by roentgen therapy at St. Mary's Hospital, where she received a total of 7,310 r. units.

Seventeen months later she was admitted to the Kings County Hospital with the cervix entirely healed and a metastasis in the lower part of the right broad ligament, extending posteriorly. A laparotomy was done with implantation of 13 gold radon seeds of 1.3 mc. each, giving a total radiation dose of 1,490 mc. hours (Fig. 1). This was followed by 5,200 r. unit cycle of roentgen therapy. Eight months later she received 2,150 mg. element hours of radiation in the right vaginal fornix.

In June, 1934, nearly three years after the original treatment, there was a question as to whether the parametrial extension had been cured, and a second laparotomy was done. On opening the abdomen there was no carcinoma found; the mass which had been felt was due to adhesions and fibrosis, and a small retroverted dextro flexed uterus. There were innumerable yellow millet seed sized growths spread

and museultation; no râles heard. Breasts were normal; no secretion observed. Abdominal: there was a diastasis of about 2 cm.: abdominal wall strong otherwise. Inspection showed a mass which was chiefly confined to the left lower abdominal quadrant, but which extended also into the right quadrant but not as high on this side. The mass reached 15 cm. above the pubis on the left and in midline 10 cm. above the symphysis. It was not tender; felt very soft and cystic; there was no muscle spasm. No fetal parts could be outlined; no fetal heart sounds heard; uterine souffle was noticed. Pelvic examination showed moderate relaxation of the pelvic floor with old healed perineal tears. The levator muscles and perineal body were adequate. Vulvar glands and urethra were normal. There was a moderate sagging of the bladder base on straining down. Vaginal walls were clean and normal on inspection. The cervix was situated at the lower margin of the symphysis, was blunt, and softened and showed moderate ulceration and infection on speculum

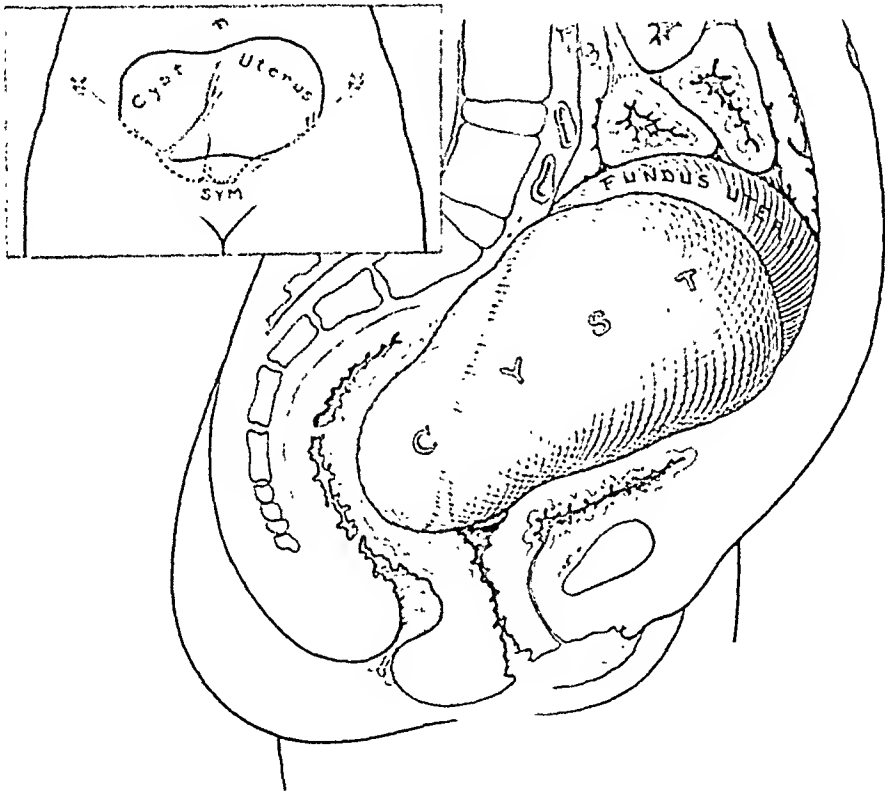


Fig. 1.—Diagrams showing the relative lateral, posterior, and inferior position of the cyst; note the displacement of the gravid uterus upward and to the left; (insert) the gravid uterus represented the greater portion of the abdominal tumor.

examination. Uterus, tubes and ovaries could not be outlined separately. The abdominal mass was continuous with a pelvic mass which filled the culdesac with considerable bulging of the posterior vaginal wall; this mass, as described, was situated chiefly in the left lower abdominal quadrant but in its lower abdominal and pelvic portions involved the right quadrant also. No areas of different consistencies could be made out. The mass was cystic, not tender, and fixed. Rectal examination added no additional information.

Weight 106 pounds; blood pressure 148/86; temperature 37° C.; pulse 78; and respiration 20. Laboratory findings: Hb 70 per cent; R.B.C. 4,470,000; W.B.C. 7,700; Wassermann negative; urinalysis: clear, yellow, acid, 1.016, sugar negative; albumin negative; 10-12 W.B.C. per high power field; 0 R.B.C.; 0 casts; sedimentation rate 3 mm. in first thirty minutes.

over the peritoneum, intestines, uterus, tubes, and broad ligaments. One of these situated in the left tube was excised for pathologic study. The report showed it to be composed of fibrotic connective tissue, with involuntary muscle fibers with which are quite a number of blood vessels, some of which the lumen completely obliterated. No evidence of malignancy was present; probably result of previous radiation therapy.

This patient has had no further treatment, and is now past four years from the original treatment, and is in perfect health.

A thorough urologic examination should precede radiation for cervical cancer, and is essential before interstitial radiation. It should consist of a cystoscopy for bladder metastases, or extrinsic tumor pressure, with the passage of large ureteral catheters, or better still, No. 8 Braasch bulbs, to disclose the presence of congenital or old inflamma-

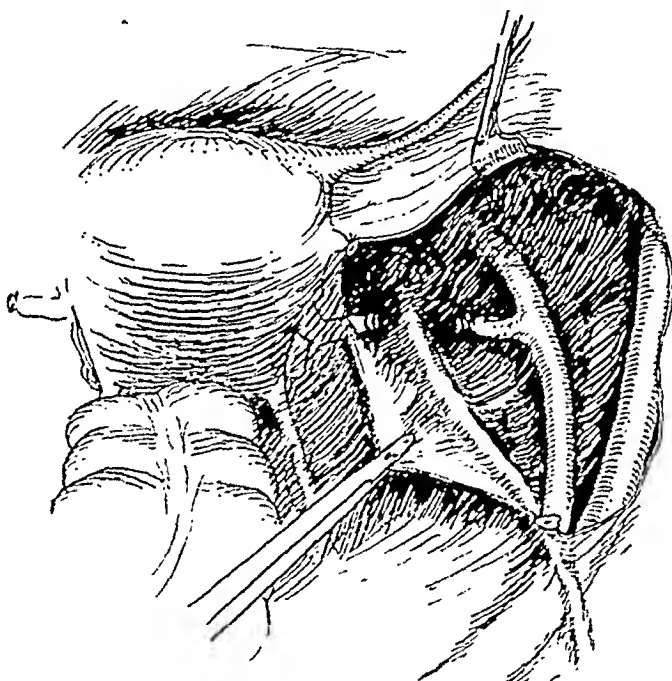


Fig. 4.—The right ovary and tube have been removed. The layers of the broad ligament have been separated. The ureter is shown attached to the posterior layer. The uterine artery has been resected where it crosses the ureter. This reduces the blood supply to the primary growth.

tory strictures of the ureters or occlusion by extrinsic growths. If ureteral obstruction or reduced kidney function is found, an intravenous urographic study is indicated (Figs. 2 and 3).

A cystoscopy with introduction of large ureteral catheters should be done at the time of operation to show the course of the ureters and make identification easy. Radon seeds should not be placed nearer than 1 cm. to the ureters as fibrosis and constriction might occur.

Cystoscopy and examination of the ureters should be repeated two months after radiation, and, if constriction has occurred, repeated dilatation should be done. Large blood vessels must be carefully avoided. If seeds are implanted in too close proximity to the veins thrombi may occur, followed by pulmonary embolus.

Microscopic Examination.—The section shows a portion of the wall of the uterus in the area of the uterine cavity and the large cyst. In the area of the endometrium there are decidua cells. Many of the endometrial glands are greatly dilated while

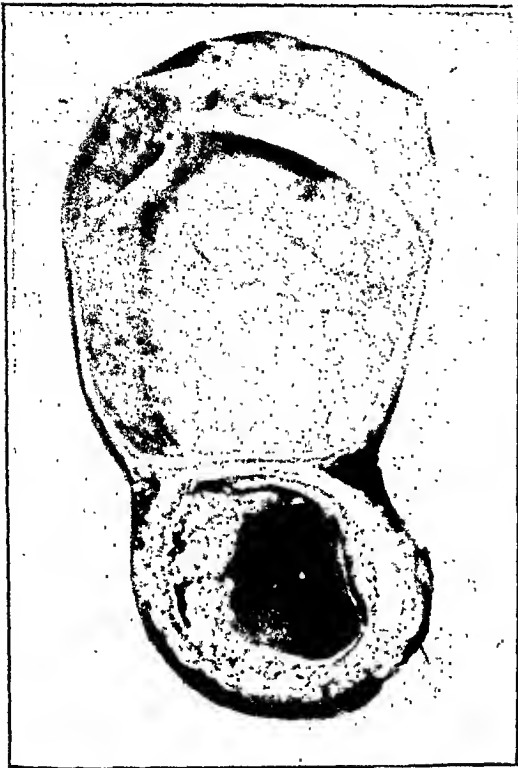


Fig. 2.



Fig. 3.

Fig. 2.—The inner surfaces of cyst and gravid uterus.

Fig. 3.—The posterior surface of the tumor mass. The stump of cervix is shown at the left lower margin. Portions of the right tube and round ligament are visible at right upper margin. Photograph is made from formalin-fixed specimen and the resulting distortion gives an imperfect idea of the inferior portion of the cyst which filled the culdesac. Diagrams in Fig. 1 give a better idea of topography.

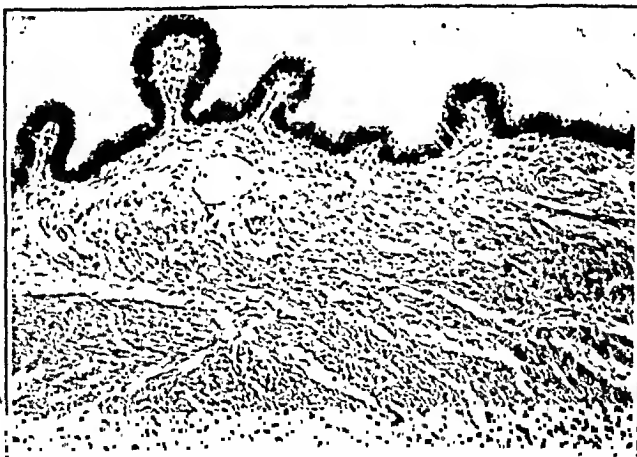


Fig. 4.—The epithelial lining of the cyst showing small papillary-like projections into the lumen ($\times 120$).

few of the endometrial glands appear relatively normal. Few mononuclear cells and leucocytes are present in the stroma of the endometrium. Many giant cells are present in portions of the stroma. Few chorionic villi are also present. Many of the blood vessels of the myometrium are dilated. The cyst is lined by a single

3. That sixteen 1 mc. radon seeds be implanted; eight in the lower uterine segment, two in each broad ligament near the uterus, and two in each sacrouterine ligament (Fig. 5). This would give a total radiation dose of 2,128 mc. hours.

4. That all the retroperitoneal fat that is exposed be removed, for it may contain small lymph nodes.

REFERENCES

- (1) *Taussig, Fred J.*: AM. J. OBST. & GYNEC. 28: 650, 1934. (2) *Gellhorn, George*: AM. J. SURG. 27: 422, 1935. (3) *Delporte, F., and Cahen, J.*: Cancer 5: 289, 1928.

462 OCEAN AVENUE

DOUBLE MALIGNANT TUMORS OF THE UTERUS*

VIRGIL S. COUNSELLER, M.D., AND WINFIELD L. BUTSCH, M.D.,
ROCHESTER, MINN.

(From the Division of Surgery, the Mayo Clinic)

TWO malignant tumors in the same uterus constitute an extremely rare and unexpected finding. While the symptoms are the same as those usually found in malignant disease of the uterus, the interest that this condition aroused prompted us to report two cases which were seen at the same time on the surgical service of one of us (Counsellor).

REVIEW OF THE LITERATURE

Multiple primary malignant growths have been reported many times. The first case was reported by Billroth, in 1869. The patient in this case was a man who was suffering from carcinoma of the stomach and an epithelioma of the external ear. Since then, Warren and Gates have reviewed all of the cases that have been reported. At the time of the writing of their article in 1932 these had reached 1,259. The great majority of the reports in this large series concerned two different primary malignant tumors, but strikingly enough, in 111 cases there were three or more primary malignant tumors. Rappin reported a case in which the patient was a woman, aged fifty years, who had 251 different epitheliomas of the basal cell type.

The frequency with which multiple primary malignant tumors occur is of interest, although difficult to determine exactly as reports vary according to their source. In Germany, Junghaus found that the incidence was only 0.5 per cent in 4,192 cases in which patients who had malignant disease came to necropsy, and Brandt and Jakobson reported the same incidence (0.5 per cent) in 2,083 similar cases. Hanlon of the Mayo Clinic found that the incidence was 2.5 per cent in 710 similar cases. The incidence in the 1,075 cases reviewed by Warren and Gates was 3.7 per cent. Schreiber and Wehr studied the microscopic sections of tissue removed in 11,212 cases of malignant disease and found the malignant tumors to be multiple in 2.7 per cent of the cases. Hurt and Broders in a similar report found the incidence to be 3.5 per cent in 2,124 cases of malignant disease seen at the Mayo Clinic. The

*Submitted for publication October 5, 1935.

embryonal kidney tissue. Frankl further states that the only criterion in judging the origin of these cysts is their embryonal-topographic relationship. He emphasizes the origin of certain of these cysts from the müllerian duct and its derivative, the uterine mucosa. He notes that Robert Meyer, Ferroni and Mandach have found in the uterus epithelial islands which originate from the müllerian ducts; the location of these in midline is explained by Robert Meyer as due to the ducts meeting here "a difficult terrain on penetration of the mesenchyme." Frankl considers that the point of union of the two ducts offers many opportunities for embryonal rests; particularly due to the primary invaginations of the walls. Frankl, Dworzak,¹⁵ Stübler,²⁴ and Ottow¹² consider the cysts reported by them as originating from the müllerian ducts.

Due to the lateral course of the wolffian ducts, cysts which arise from the lateral or cornual portion of the uterus or above the insertion of the round ligament suggest origin from the rests of Gartner's ducts. Those which arise from the mesial portion of the uterus may have as their source remnants of the müllerian ducts or glands of the endometrium.

The epithelium lining of these cysts may vary considerably; it may be ciliated or nonciliated columnar, pavement epithelium or may not be demonstrable. In some cases as reported by Merendée²⁹ and Amann,³⁰ the epithelium may show slight projections into the cavity, papilliform in type but Haarblicher¹ thinks this probably is due to the section passing through a fold or curve of the cyst wall, as so commonly happens in curettings. Our case showed areas of such configuration. None of the reported cases reviewed showed any malignant changes in the cyst wall.

In our case, the attention of the patient to the mass was the result, no doubt, of the enlargement of the pregnant uterus which was pushed out of the pelvis by the cystic portion; no doubt, had not the menses been irregular she would have considered herself pregnant and sought no medical attention. Therefore, her symptoms were of a duration equivalent to the onset of the pregnancy. The duration of the tumor is uncertain as we have no record of any previous pelvic examination: her deliveries were under the care of a midwife. The absence of any complications from her previous pregnancies can probably be explained by the upper uterine origin of the mass with the result that in the course of labor the cystic portion of the uterus was brought into abdominal location and did not tend to block the entry of the presenting part into the pelvis. This might well have happened in the pregnancy interrupted by operation. In the pregnancy found at this operation, the placenta will be seen to have a safe attachment away from the cystic portion of the uterus. The wall of the uterus in relation to the cystic portion is strong and one would not suspect weakening of it to such an extent that spontaneous rupture or rupture in the course of labor might occur.

The pathologic studies and operative findings would lead us to believe this cyst to be of congenital origin. Due to its broad, fundal and medial location, one is inclined to believe that it probably originated from rests of the müllerian ducts.

SUMMARY

We report a large intramural cyst of the uterus occurring in a negress, aged thirty-six, who was about two and one-half to three months pregnant at the time of operation. Five previous pregnancies, parturitions and puerperiums were uncomplicated. The literature of previous cases has been reviewed and the theories of etiology and pathology are discussed. The reported case is thought to be of congenital origin, probably arising from rests of the müllerian ducts.

had been marked by excessive bleeding and passage of clots. After this, she had lost just a small amount of blood a day, enough to necessitate the constant wearing



Fig. 1.—Gross specimen from Case 1 showing the carcinoma involving the internal os and another carcinoma at the left uterine horn.

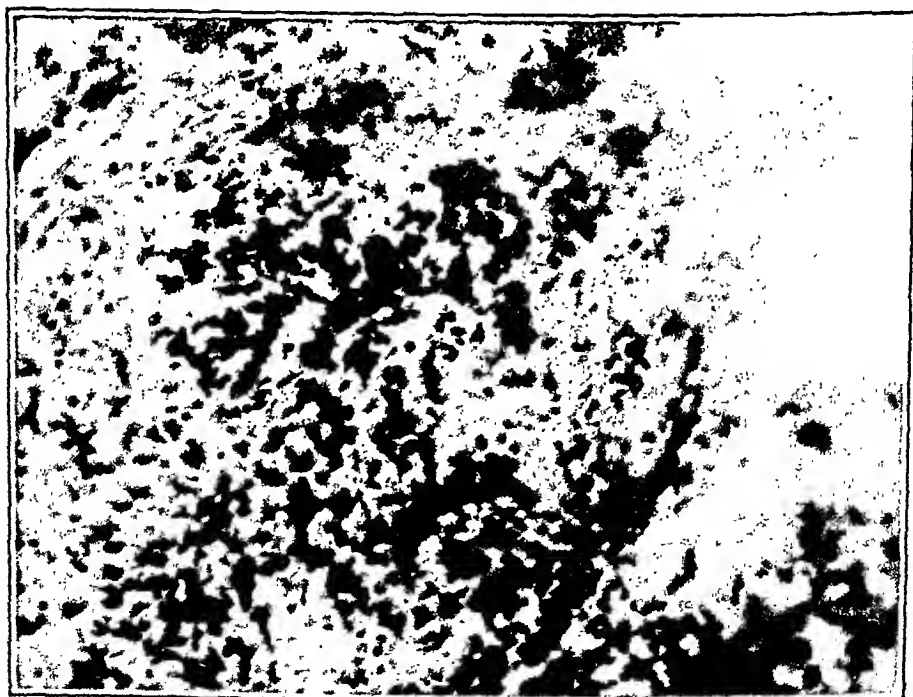


Fig. 2.—Section of the squamous cell epithelioma, Grade 3, at the internal os (X275).

of a pad. A year ago, before she came to the clinic, excessive flow again had occurred. The intervening menstrual periods had been normal. Dilatation and curet

The menses began at the age of eleven, at intervals of thirty to thirty-five days, and continued for four or five days. The flow was not excessive at any time, but there had been a slight increase in the past six months. Some pain was experienced the first day, yet she was never confined in bed.

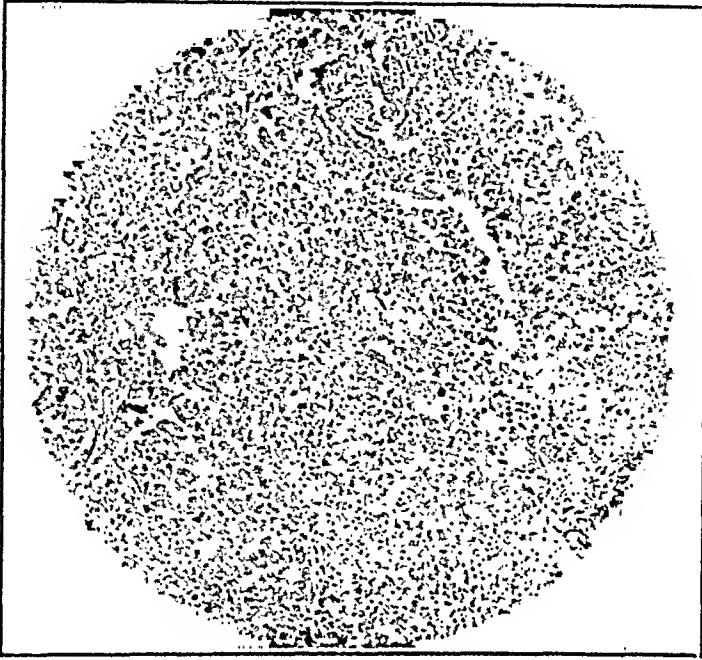


Fig. 1.—Low-power photomicrograph showing glandular formation of the neoplasm and the sparse fibrous supportive stroma.

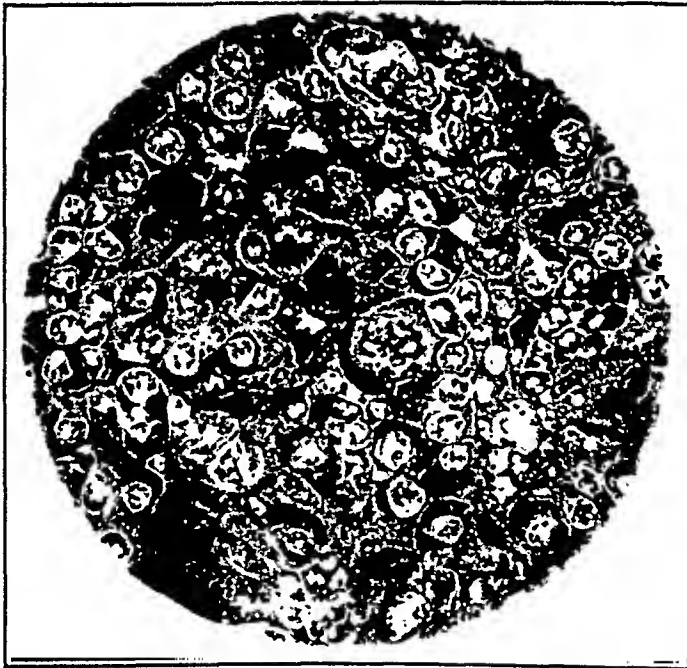


Fig. 2.—High-power field of the tumor revealing rounded cells with large vesicular nuclei, multiple large nucleoli, and atypical mitotic figures.

The patient had influenza at the age of nine years but made a good recovery. She had always had good health, and there was no history of chronic or malignant diseases in her family. The patient was well developed and well nourished. Her

tage had been performed. The microscopic report had been polypoid endometrium. The operation had not altered the clinical picture, which had continued as stated, until five months ago, when menstrual periods had become longer than they had been

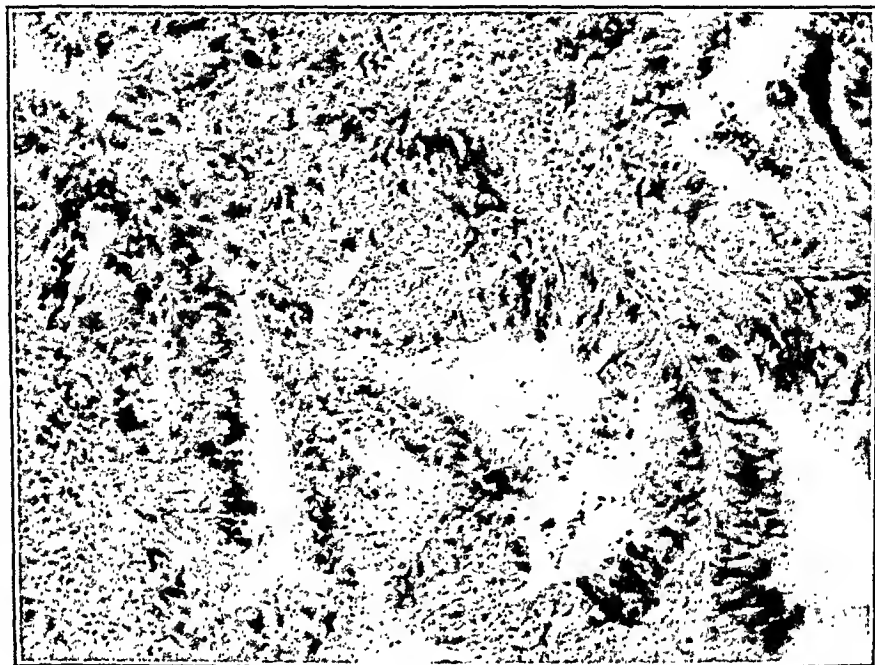


Fig. 5.—Section of adenocarcinoma, Grade 3, near the internal os of the uterus ($\times 120$).

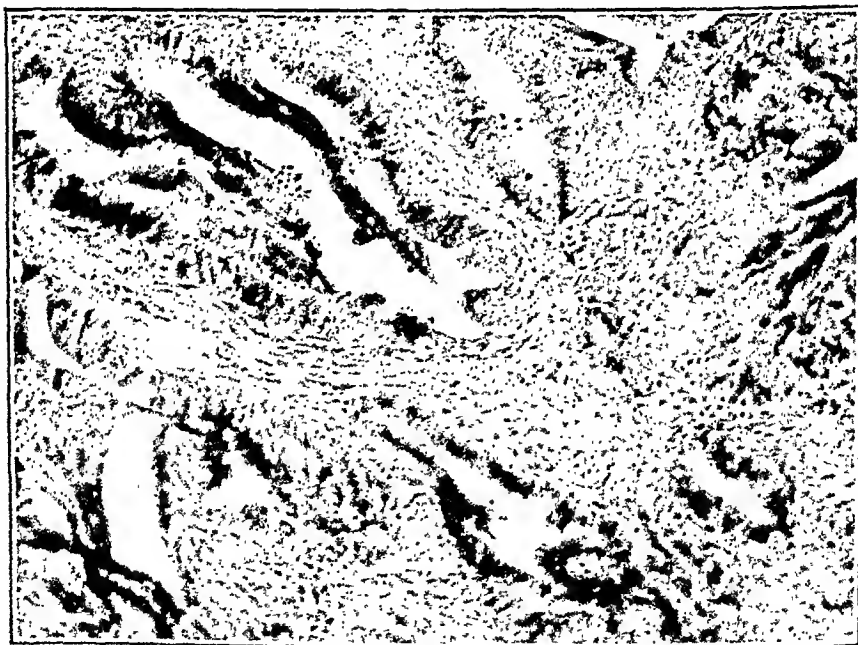


Fig. 6.—Section of adenocarcinoma, Grade 2, near the fundus of the uterus ($\times 120$).

The patient's last visit was on Feb. 2, 1935, a little over five years since treatment was instituted. She weighed 131 pounds, and appeared in excellent health. On examination the uterus was found to be small. There was some constriction of the left vaginal vault and slight induration to the left and posteriorly. The patient reported that there was some prolongation of the menstrual period in January, 1935, but that the total amount was not excessive.

SUMMARY

1. The paucity of cases among earlier authors and the increasing number reported at the present time emphasizes the necessity for more prompt recognition and reporting of such cases.

2. Because of the admitted high mortality rate of carcinoma cases among the young every available method for thorough treatment was employed.

3. The amount of the initial dose of radium utilized was smaller because of the anatomic proximity of the bladder, urethra, and rectum. With this in mind the danger of an ensuing fistula between these structures and the vagina had to be considered.

REFERENCES

- (1) *Bonner, Adolph*: AM. J. OBST. & GYNEC. 14: 175, 1927. (2) *Morse*: AM. J. OBST. & GYNEC. 19: 520, 1930. (3) *Baldwin, L. G.*: AM. J. OBST. & GYNEC. 21: 728, 1931.

CHORIOMA (CHORIOADENOMA TYPE)*

JOSEPH J. MUNDELL, M.D., WASHINGTON, D. C.

MRS. T., aged twenty-five years, married five years, never pregnant. Menses were always irregular, usually every thirty-five days but often missing one or two months, occasionally three or four months.

Present illness.—Last normal menstruation began May 6, 1934. Beginning June 20 there was a scant light brown vaginal spotting following micturition. This recurred for a day or so at a time, every few days. She was put to bed on July 8 because of bleeding which increased in amount until July 16, when she aborted. On July 15 an Aeschheim-Zondek test was positive. Patient says that on July 16 she passed a sac and that twelve hours later there was a hemorrhage and the following day she passed a large mass having the appearance of fish roe. Free bleeding in spite of ergot, etc., continued until her admission to Providence Hospital, August 17.

Examination revealed a soft patulous gaping cervix and a slightly enlarged soft boggy fundus. On August 18 under gas anesthesia retained secundines were removed. The pathologic report of the moderate amount of material removed stated that it consisted of numerous blood clots, laked blood, collection of red blood cells, degenerated fragments of tissue with the morphology of chorionic villi, and pieces of endometrium. Scattered throughout the hemorrhagic tissue, in certain sections, are sheets of fairly large ovoid, pale staining cells with granular cytoplasm, which are typical decidua cells. There are also collections of deeply staining cells, some of which have formed multinucleated masses. There are other smaller collections of cells which are larger in size, and with large, pale, vesicular nuclei. These collections of cells are prominent in the regions showing the degenerated, hyalinized villus-like tissue, and are hyperplastic syncytial, and Langhans' cells.

*Presented at a meeting of the Washington Gynecological Society, January 26, 1935.

TREATMENT OF AMENORRHEA*

II. EFFECTS OF ANTERIOR PITUITARY-LIKE HORMONE FROM THE URINE OF PREGNANT WOMEN. ELEVEN TRIALS IN FOUR PATIENTS

JOHN ROCK, M.D., AND MARSHALL K. BARTLETT, M.D., BOSTON, MASS.

(From the Sterility and Endocrine Clinic, Free Hospital for Women, Brookline)

BECAUSE the anterior pituitary-like hormone from the urine of pregnant women stimulates the quiescent ovaries of intact, immature rats and mice to mature and develop functioning follicles and corpora lutea (the Aschheim-Zondek reaction); and because the resting ovaries of intact, mature rabbits can likewise be stirred into similar activity, it has been thought by many¹ that this effect can be obtained in human beings in whom amenorrhea bespeaks inactive ovaries. To show that this does not always occur is the purpose of this paper.

When follicles become mature they secrete estrin which causes the endometrium to proliferate. When the corpus luteum is formed, progesterin is elaborated. This further stimulates the endometrium, which thus develops into the so-called secreting, functional, or progestational phase. If the endometrium of a patient with amenorrhea atrophies or remains in an early resting condition, an absence or marked insufficiency of estrin may be assumed, and therefore, also, an absence of functioning follicles or a hypoplasia of such. If it remains in the proliferative phase, as is characteristic of those periods of amenorrhea interspersed with menorrhagia, which form the clinical entity, metropathia hemorrhagica, or dysfunctional uterine hemorrhage, it may be assumed that estrin is constantly present and therefore that an abnormally functioning follicle is present in the ovary. In such a condition of persisting proliferation in the endometrium without succeeding secretion, the absence of progesterin can likewise be assumed, and, therefore, a failure of corpus luteum formation: for were this body present, its hormone would cause further development of the endometrium from the proliferative to the secretory stage. If, then, we know the condition of the endometrium, we may deduce the condition of the ovaries.

To test the assumption that pregnancy urine extract of anterior pituitary-like hormone would stimulate the ovaries of women with amenorrhea, as it does the ovaries of some laboratory animals, we obtained specimens of the endometrium by the suction curette² at various times during the amenorrhea of several patients, and other specimens before and after the

Society Transactions

WASHINGTON GYNECOLOGICAL SOCIETY

Meeting of January 26, 1935

The following papers were presented:

A Study of the Postnatal Clinic of Columbia Hospital Out-Patient Department.
Dr. Joseph Harris.

Abdominal Pregnancy. Dr. W. R. Thomas.

Acute Puerperal Inversion. Dr. J. B. Jacobs.

Chorioma (Chorioadenoma Type). Dr. J. J. Mundell. (For original article, see page 539.)

Item

American Board of Obstetrics and Gynecology

The next written examination and review of case histories of Group B applicants for certification by this Board will be held in various cities of the United States and Canada on Saturday, March 28, 1936.

The oral, clinical and pathological examination of all candidates for certification by this Board will be held in Kansas City on Monday, May 11, and Tuesday, May 12, 1936, immediately prior to the scientific session of the American Medical Association. Applications for Group A candidates must be received not later than April 1, 1936.

The annual informal dinner and general conference of Diplomates attending the American Medical Association convention will be held at the Hotel Kansas Citian, Kansas City, Missouri, on Wednesday, May 13, at 7:00 P.M. At this dinner the successful candidates from the examinations of the two preceding days will be presented in person, and short addresses will be made by two members of the Board and two invited guests.

For further information, booklets, and application blanks, apply to the Secretary, Dr. Paul Titus, 1015 Highland Building, Pittsburgh (6), Pennsylvania.

day. May 5 to May 12, antuitrin-S, 3×500 rat units. May 22 to May 26, progestin, 3×2 rabbit units. May 25, catamenia one day. June and July, 1933, no treatment and no flowing. July 28, biopsy: atrophic endometrium. July 28 to Aug. 4, theelin, 2×500 rat units. August 4, biopsy: ten-day dysplastic endometrium. August 6, catamenia three days. August 8 to August 11, theelin, 2×500 rat units. August 11, biopsy: atrophic endometrium. August 17, patient flowed profusely for twenty-four hours and passed clots. September 1, biopsy: atrophic endometrium.

The results of the treatment here are confusing. After 37×500 rat units of theelol by mouth, the endometrium, as would be expected, had grown from the atrophic to the twelve-day proliferative stage. The patient flowed for five days, two napkins a day, beginning on the day of the last dose. It has been shown in monkeys that estrin will delay the onset of an expected flow while it is given, until, after long dosage the flowing mechanism escapes from the inhibition of the estrin and the delayed flow occurs. Werner and Collier³ have likewise shown a similar phenomenon in castrated women who flowed while taking estrin. This is not unlike the mechanism of flow in women with dysfunctional uterine hemorrhage. Perhaps this explains the flow in this patient so soon after she had taken 36×500 rat units of theelol.

It might be noted, however, that the flow occurred two days after a biopsy. Fifteen days after that period began, a series of 5×500 rat units of antuitrin-S was started. A biopsy taken three days after the last dose revealed an atrophied endometrium; yet, nevertheless, flow, requiring two napkins a day, began again two days after the biopsy, and lasted for five days. The following month after only 2×500 rat units of antuitrin-S the patient flowed slightly for two days after a biopsy showing a fourteen-day proliferating endometrium. A year later after only 500 rat units of theelin this patient flowed for three days, again two days after a biopsy which showed atrophy of the endometrium. On the day between the biopsy and the flow she had another 500 rat units of theelin. It must not be assumed that any flowing which occurred after antuitrin-S was induced by it, for it has been noted by several observers that instrumentation of the uterus may upset the existing endocrine situation in the human being as it always does in the mature isolated female rabbit, cat, and ferret. It is conceivable that such an interference is accountable for the twelve-day proliferation found on May 5, 1933, after only 2×500 rat units of antuitrin-S, though it could be argued that this was a late effect of the 5×500 rat units of antuitrin-S given six weeks before. Such an effect was not found in the two trials with the previous patient, however, nor in the three trials with the following patient. At all events, this second patient, like the first, fails to show in her endometrium any corpus luteum effect after the injection of pregnancy urine extract. Once she showed an estrin effect after 2×500 rat units of antuitrin-S probably not due entirely to the possible stimulating effect of this hormone on the ovaries, but rather, perhaps, to the indirect effect of the cervical stimulation on her own anterior pituitary.

He gives a detailed account of the operative method consistently employed, namely, anterior colporrhaphy and colpoperineorrhaphy with high levator suture, in some cases combined with amputation of the cervix.

Of the 104 cases 95 were subsequently examined, on an average of 4 years and 7 months after the operation. Of these 95 patients 86 (90.5 per cent) were completely cured, 2 improved, and 7 (7.4 per cent) not cured. Of 76 patients actually examined long after operation, 70 (92 per cent) were found completely cured, 1 improved, and 5 (6.6 per cent) not cured.

Six patients were delivered after operation, 11 times in all. Prolapse recurred in 2 of these.

A study of these cases leads the author to the following conclusions: Amputation of the vaginal portion of the cervix may cause premature labor in subsequent pregnancies. Labor after a plastic operation on the pelvic floor will not be appreciably longer than normal. Careful supervision during labor, particularly when the head has reached the pelvic floor, and early, extensive perineotomy are essential. If necessary, outlet forceps should be employed.

Anterior colporrhaphy and colpoperineorrhaphy, combined if necessary with amputation of the vaginal portion of the cervix, provide a very high degree of fulfillment of all reasonable demands made on the operative treatment of prolapse, as it relieves the patient from distress; it is practically without risk; its technique is easy; and it leaves the patient's genital functions absolutely unimpaired.

J. P. GREENHILL.

Müller, W.: Pulmonary Embolism After Gynecologic Operations, *Monatsehr. f. Geburtsh. u. Gynäk.* 95: 153, 1933.

At the Hamburg Woman's Clinic between 1919 and 1931 the mortality from postoperative pulmonary embolism was 0.6 per cent greater than it had been previously. The type and duration of operation play a rôle. Most emboli occurred after operations for carcinoma and myomas. Age also is a factor as are also disturbances in the circulatory system. Müller could not detect that narcosis had any evil effect. Most of the emboli occurred during the fall and winter months. The Trendelenburg operation was performed 3 times without any success. Most deaths from emboli are due not to choking but to disturbances in the heart. All the fatal cases showed abnormalities in the heart and blood vessels. Hence prophylactically and therapeutically the author advocates heart stimulants, but he warns against the use of quick-acting cardiac stimulants such as adrenalin in order to avoid further thrombosis. The latter is treated by bed rest and elevation of the affected extremity. Respiration is stimulated by exercise, oxygen and carbon dioxide. Most thromboses also were observed in the fall and winter months.

J. P. GREENHILL.

Lifvendahl, R. A.: Gonococcal Laparotomy Wound Infections, *Am. J. Surg.* 21: 123, 1933.

From a review of the literature it is evident that the skin and subcutaneous tissues are not the most suitable soil for the development of gonococci. Lifvendahl reports a case in which an abdominal wound was infected by this organism. The supravaginal portion of the uterus, both tubes and ovaries, and the appendix were removed. After the intraabdominal surgery was completed, clean instruments, gloves, and linen were used in order to prevent infection being carried from the

TABLE I. EFFECTS OF P.R. (A.P.L.) EXTRACT IN AMENORRHEA *

AGE	DURATION OF AMENORRHEA	MOOSE BEFORE	TREATMENT	MOOSE AFTER	FLOW
28	2 1/2 yr.	Atrophic endometrium	Follutein 5 x 500 R.U.	Atrophic endometrium	0
28	2 1/2 yr.	Atrophic endometrium	Follutein 6 x 500 R.U.	Early prolif. endometrium	0
28	2 1/2 yr.	Early prolif. endometrium	Follutein 6 x 500 R.U.	Atrophic endometrium	0
29	2 yr.	-----	Antuitrin-S 5 x 500 R.U.	Atrophic endometrium	5 days
29	2 yr.	-----	Antuitrin-S 5 x 500 R.U.	14-day endometrium	1 day
		-----	Proluton 2 x 2 rabbit units		
27	1 1/2 yr.	-----	Antuitrin-S 2 x 500 R.U.	Atrophic endometrium	0
27	1 1/2 yr.	Resting endometrium	Antuitrin-S 6 x 500 R.U.	Resting endometrium	0
27	1 1/2 yr.	Resting endometrium	Antuitrin-S 7 x 500 R.U.	6-day proliferating endometrium	0
27	1 1/2 yr.	-----	Follutein 6 x 500 R.U.	21-day secreting endometrium	0
27	1 1/2 yr.	Resting endometrium	Progynon 5 x 5000 R.U.	Early prolif. endometrium	0
		-----	Follutein 5 x 500 R.U.		
33	1 yr.	-----	Antuitrin-S 3 x 500 R.U.	Resting endometrium	0

* eleven experiments was a secreting endometrium found after giving pregnancy urine extract. In two cases flow was not clearly due to it (see text). Nor can a change from atrophic or resting endometrium to an early prolif. be attributed to the treatment for many patients with amenorrhea have an endometrium which varies within even six months of ovarian activity.

Wolf, O.: The Operative Treatment of Adnexal Tumors, *Monatschr. f. Geburtsh. u. Gynäk.* 100: 41, 1935.

At the Kiel Clinic, Wolf observed 275 operations for large adnexal tumors. In this series 56 had acute infections and 25 per cent of the women died. There was a second group of 75 cases which could not be cured by conservative measures. Here there was a tendency to recurrences in the form of ovarian abscesses. The mortality in this group was 8 per cent. In the final group of 144 cases operation was performed only for local disturbances. In this group gonorrhea was the etiologic factor in 35 cases, septic processes in 44 and tuberculosis was present in 11 cases. The death rate in this group was only 2 per cent.

The author emphasizes that in cases of adnexal tumors there is no single type of treatment. Neither etiology nor morphology nor pathogenesis, can solely determine appropriate treatment. We must depend upon the entire clinical picture for our course of action.

J. P. GREENHILL.

Siegmund, H.: Ovarian Function Following Hysterectomy, *Arch. f. Gynäk.* 157: 223, 1934.

Siegmund performed hysterectomies on 40 rabbits and studied the ovarian function for periods up to one year following the operation. He found that ovulation went on undisturbed. Maturation of the follicle, and ovulation and corpus luteum formation are apparently unaffected by removal of the uterus. He therefore concludes that the uterus plays no rôle in the normal sequence of ovarian function.

RALPH A. REIS.

Pavlenko, S. M.: Experimental Data on the Question of Transplantation of Ovaries, *Vestnik Endocrin. (Moscow)* 4: 283, 1934.

For experimental transplantation of ovaries the place to which the ovary is transplanted plays a very insignificant rôle.

In regard to physiologic effect of auto- and isograft transplantation of ovaries, it seems that they are equivalent in qualitative and quantitative respect. Heterograft transplantation of ovaries has less effect than auto- and homograft transplantation.

Transplantation of ovaries to the castrates does not return the sexual cycle peculiar to normal females, but produces prolonged uninterrupted estrus, which depends, as it seems, in the first place on breaking the connection of the ovaries with the nervous system.

Prolonged state of castration sharply decreases the percentage of successful results after the transplantation of ovaries.

ALEXANDER GABRIELIANZ.

Cheval, M.: Ovarian and Uterine Grafts, *Bruxelles-méd.* 14: 1138, 1934.

The ovarian graft, when the uterus is left in place, is certainly useful. However, after hysterectomy the ovarian grafts are not useless but their activity will be diminished by the destruction of ovarian tissue due to atretic phenomena. The uterine graft is realizable under aseptic operative conditions. It brings about in the ovaries luteinization of the atretic follicles. It seems that the uterine grafts better ovarian conservation, and that these grafts help to continue ovarian activity after hysterectomy.

J. THORNWELL WITHERSPOON.

THE INCIDENCE AND TREATMENT OF SECONDARY ANEMIA IN OUT-PATIENT MATERNITY PATIENTS*

OWEN J. TOLAND, M.D., PHILADELPHIA, PA.

(*From the Service of the Lying-In Hospital*)

THE fact that the anemias of pregnancy, both primary and secondary, respond rapidly, and in some instances dramatically, to appropriate therapy has been conclusively demonstrated by the work of Strauss and Castle,¹ of Mettler and Minot,² and others. Since these advances, the extent of the obligation of obstetricians to their ward patients in this respect has become somewhat difficult of determination. We would not wish to neglect the treatment of serious anemias in the patients coming to our ward services for prenatal care and delivery, and at the same time we do not want to lay additional and possibly unnecessary burdens both of time and expense on the already overstrained prenatal facilities for ward cases. The taking of blood counts and estimation of hemoglobins is a meticulous, time-consuming business and, if not properly done, is valueless. If such study were to be incorporated as a routine part of prenatal care for all ward patients, an already elaborate regime would be greatly complicated, and the present-day burden of hospital expense would be aggravated. Would it not be safe to rely upon our clinical acumen and order such studies only on patients whose general appearance and symptoms were suggestive, as we have done heretofore? This presentation makes an attempt to answer these questions, and some other related problems. One of these is whether iron therapy is as highly effective when the patient is not in the hospital, and where lack of intelligence and of cooperation must be reckoned with. Not unimportant also is the question as to whether some more convenient form of iron therapy would be as effective as treatment with iron and ammonium citrate which heretofore has generally been accepted as standard. With this in mind, we decided to try the use of ferrous sulphate in tablet form, since recent reports in the literature^{3, 4, 5} seem to indicate that from the point of view of dosage it is some ten times as potent in hemoglobin regeneration as iron and ammonium citrate, and more convenient of oral administration.

Correspondence

To the Editor:

The comprehensive presentation, by J. Mason Hundley and associates in a paper entitled *Physiologic Changes Occurring in the Urinary Tract During Pregnancy*, in the November issue (1935) of the JOURNAL, supplies a vast amount of exceedingly useful and practical data, not entirely new. It serves to crystallize our knowledge of the subject under consideration. But I cannot desist from remarking that several of his statements require correction and certain focal points about which the problem revolves have been omitted in this treatise. Science is regarded as the single-minded pursuit of truth. Toward this accomplishment the following discussion is offered.

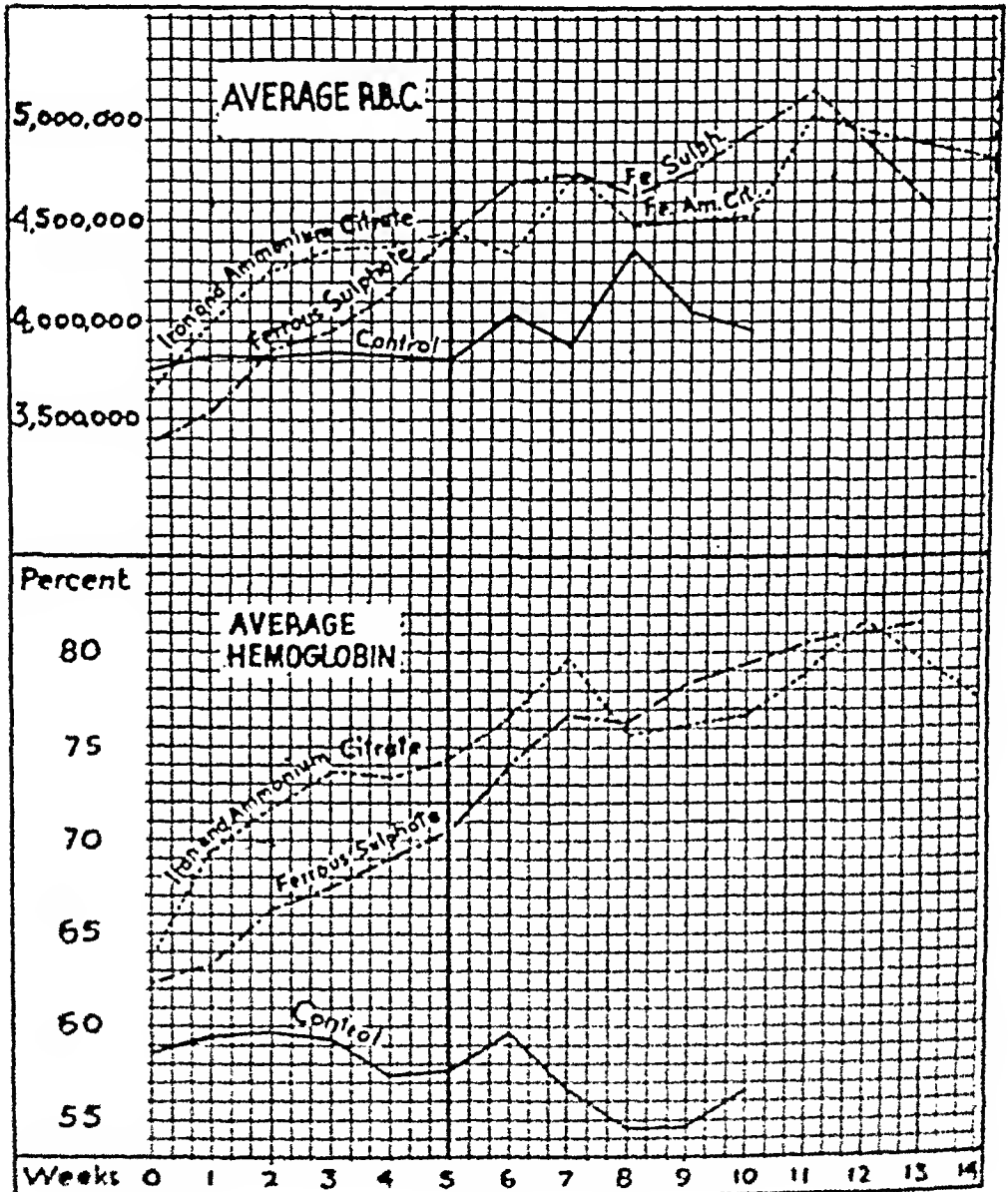
Until 1928, biologic or anatomic research on the etiology of ureteral dilatation during pregnancy and its bearing on several aspects of pyelitis has been conspicuously lacking. It is with a certain sense of pardonable pride at the achievement that, as the universal acclaim accorded my addresses tends to indicate, the appearance of these contributions apparently turned the tide.*

Because of the frequency of pyelitis complicating pregnancy, the incidence being 5 per cent of all pregnant women not including the mild cases which do not require admission to the hospital, our studies attempted to determine and reveal unrecognized but actual predisposing etiologic factors and their correction whenever found feasible. It was realized at the outset that the problem is one of considerable complexity and should be attacked from a combined point of view. In our study, a clear understanding of the finer anatomy of the ureter during gestation appeared to be the first consideration; the integration of this and additional information being looked for in the successful delineation of the entire ureter and renal pelvis in pyelograms taken during the various months of pregnancy. On painstaking examination, very remarkable phenomena were found to occur as invariable features of the histology of the juxtavesical portion of the ureter during pregnancy—the interlacing of hypertrophied muscle bundles and hyperplastic, newly formed, dense connective tissue strands. It was emphasized that this part of the ureter has, thus, become converted from a collapsible organ into a more or less unyielding tube, and, making its way as it does through the narrow space between the bladder wall and the anterior vaginal vault, readily assumes the features of a stricture. Furthermore, this new formation of fibroblasts in the ureteral wall represented the counterpart of analogous phenomena in the uterine wall during gestation. Moreover, ureteral rigidity due to the basic structural alteration of its wall, was found to be still further accentuated by an encircling ring resulting from an excessive hypertrophy of the ureteral sheath, most noticeable at the junction of the ureter with the bladder. A number of photomicrograms served to give an idea of the wide range of variation in the hypertrophic changes of the ureteral sheath noted in our specimens. Particular stress was placed upon the hypertrophic changes, observed by us likewise for the first time, in the bladder trigone and the plica ureterica, the neck of the bladder and upper third of the urethra, notably the sphincter of the urethra; they lent themselves to the consideration of the multiplicity of obstructive lesions in the lower urinary tract.

The importance of ureteral obstruction as an etiologic factor in pyelitis has since been receiving an increasingly greater amount of attention. Color is lent to this

*Bull. Johns Hopkins Hosp. 16: 1928; J. Urology 20: 1928; Chapter XIX, in Curtis *Obstetrics and Gynecology*.

a day (total dosage 12 gr. a day), or (c) tablets containing an inert substance. The last group was used as a control. Both patients and controls were instructed to report to the special technician at weekly intervals for blood counts and hemoglobin readings. They were questioned at such visits about the symptoms produced by the medication, and were encouraged to be regular in taking their treatment.



American Journal of Obstetrics and Gynecology

VOL. 31

APRIL, 1936

No. 4

Original Communications

THE PROBABLE RÔLE OF THE HYPERCHOLESTEREMIA OF PREGNANCY IN PRODUCING VASCULAR CHANGES IN THE PLACENTA, PREDISPOSING TO PLACENTAL INFARCTION AND ECLAMPSIA*

R. A. BARTHOLOMEW, M.D., AND R. R. KRACKE, M.D., ATLANTA, GA.

*(From the Departments of Obstetrics and Pathology, Emory University
School of Medicine)*

ON THE basis of a careful gross and microscopie study of the lesions found in a series of more than one thousand placentas, correlating the clinical and pathologic findings, and producing the clinical and pathologic evidences of eclampsia by the injection of placental autolysate into guinea pigs, we stated our belief¹ that eclampsia is the result of absorption into the maternal blood of the split products of placental protein from an acutely infarcted area, and in another communication² described a possible mode of origin of the principal poisons, guanidine and histamine, from placental arginine and histidine. Since the publication of these articles, further careful study of placentas from both normal and toxic patients has only served to confirm our belief in the correctness of this theory.

Notwithstanding the consistency with which acute infarcts may be observed in the placentas of patients affected by preeclampsia, eclampsia, and abruptio placentae, statements continue to appear in the literature denying the occurrence of such a relation. Failure to appreciate this relation is due, mainly, to examining the placenta in the fresh state and

*Read before the Fulton County Medical Society, September 19, 1935.

NOTE: The Editor accepts no responsibility for the views and statements of authors as published in their "Original Communications."

8. Inasmuch as 36 per cent of the patients in this series showed hemoglobins below 70 per cent, we recommend that all maternity patients be routinely instructed to take 3 gr. ferrous sulphate tablets four times a day, during the last two months of pregnancy.

REFERENCES

- (1) *Strauss, Maurice B., and Castle, William B.*: Am. J. M. Sc. 174: 665, 1932; *ibid.*, p. 663; *ibid.* 185: 539, 1933. (2) *Mittler, Stacy R., and Minot, George R.*: Am. J. M. Sc. 181: 25, 1931. (3) *Fullerton, Harold W.*: Edinburgh Med. J., New Series 41: 1934. (4) *Davidson, L. S. P., and Leitch, I.*: Nutrit. Abst. & Rev. 3: 901, 1934. (5) *Lotttrup, M. C.*: Am. J. Dis. Child. 47: 1, 1934.

323 SOUTH TWENTIETH STREET

DISCUSSION

DR. THOMAS FITZ-HUGH, JR.—In the last ten years there has been a great revival of interest in iron therapy, with a return to the old advice of massive dosage. Accordingly we have learned that it takes about 100 gr. of ferric ammonium citrate per day for an adult to produce optimum hemoglobin regeneration (i.e., about 1 per cent increase of hemoglobin per day from a low level to a nearly normal level). The reason for this relatively tremendous requirement had not until recently been satisfactorily explained. The answer now appears to reside in the fact that only the ferrous form of iron is absorbable and utilizable in hemoglobin regeneration.

In order to produce enough ferrous iron to be effective, we have to give a large amount in the form of ferric iron. Only that portion which is reduced to ferrous form is useful. The experience of my Clinic, recently reported in detail by Dr. Clara Davis, shows results quite like those of Dr. Toland's. We have found that ferrous iron in the form of ferrous sulphate is equally effective in about one-eighth to one-tenth of the dose of ferric ammonium citrate, that it is easier to take, that it is usually better tolerated, and that it is more economical. One can maintain a patient on adequate iron therapy in the form of ferrous sulphate pills, for less than \$1.00 a month.

due to a swollen vacuolated condition of the cells within the intima, causing the lumen to appear distorted, excentric, slitlike, or almost obliterated (Figs. 1 and 2).

The significance of this appearance was not appreciated until a study of Timothy Leary's work⁴ on cholesterol-induced changes in the coronary



Fig. 1.—Section of placental artery on fetal surface of placenta from case of abruptio placentae. Appearance is that of more advanced cholesterol vascular change, with excentric narrowing of lumen due to increased fibrosis and accumulation of lipid cells beneath endothelium.

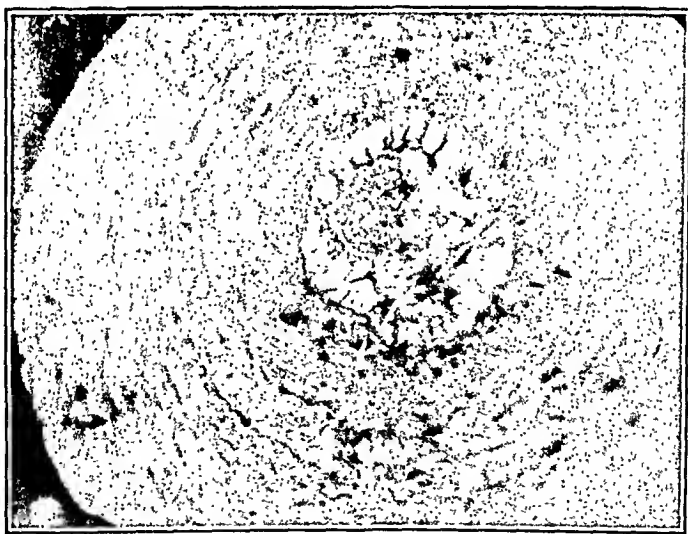


Fig. 2.—Section of placental artery from villous stem of medium size showing lipoid cells beneath endothelium. Appearance is that of early cholesterol vascular change.

arteries of rabbits strongly suggested that the unusual appearance of the placental arteries was probably of the same nature and origin. Leary, in necropsies upon individuals dying suddenly, apparently from heart failure, demonstrated cholesterol-like changes within the intima of the

tively. In the group of 734 cases with spontaneous rupture of membranes there were 215 primiparas and 211 multiparas in whom the membranes ruptured either before or during the first stage of labor, and there were 148 primiparas and 160 multiparas with second stage rupture of the membranes. In the group of 266 patients with artificial rupture of the membranes, there were 52 primiparas and 68 multiparas with rupture either before or during the first stage of labor, and 63 primiparas and 83 multiparas in whom the membranes were ruptured after onset of the second stage of labor.

Included in the group of artificial rupture of the membranes were 59 patients in whom the membranes were ruptured for the induction of labor, and of these there were 20 primiparas and 39 multiparas. These 59 patients were studied separately in order to compare them with the whole group having artificial rupture of the membranes at various stages during labor.

The whole series was studied with regard to the length of labor as influenced by the time of rupture of the membranes and according to spontaneous or artificial rupture. The incidence of postpartum temperature elevation was noted, reading of 100.4° or over from any cause for any length of time being recorded as a temperature elevation. The effect of rupture of the membranes on the incidence of operative delivery was also noted, and the results of these studies are shown in Tables I to III.

TABLE I. LENGTH OF LABOR AS INFLUENCED BY THE TIME AND CAUSE OF RUPTURE OF MEMBRANES

		PRIMIPARAS	MULTIPARAS
A. Spontaneous rupture	First stage	11.49 hr.	5.92 hr.
	Second stage	14.19 hr.	5.96 hr.
B. Artificial rupture	First stage	14.04 hr.	5.63 hr.
	Second stage	13.35 hr.	7.13 hr.

It is apparent that these figures on the average length of labor, regardless of the time or cause of rupture of the membranes, are considerably less than the figures given by Williams² for a large series of spontaneous labors at Johns Hopkins Hospital, namely, eighteen

The hypercholesteremia of pregnancy was first demonstrated by Hermann and Neumann⁵ in 1912. It has long been noted that the great majority of cases of gallstones occur in women who have borne children. Shiskin⁶ observed that the increase in cholesterol began as early as the second or third month of pregnancy, and continued until some time after delivery. Taking the normal range of cholesterol as 140 to 170 mg. per 100 c.c. of whole blood, with an average of 153.7 mg., as reported by Oser and Karr,⁷ these authors found an average value of 186.8 mg. in twenty-one cases of full-term normal pregnancy. Ferguson and Priestley⁸ collected blood from thirty patients at term and on the second, seventh, and twelfth days after delivery, also at monthly intervals thereafter and found an average value of 221.3 mg. at term. The values in multiple pregnancy were considerably above the average. They observed that the cholesterol values often remained high for some months after delivery. It has been observed⁵ that the hypercholesteremia of pregnancy passes off more quickly in women who nurse their babies.

Cholesterol, a constituent of every animal cell, is a relatively insoluble substance of complex formula, $C_{27}H_{45}OH$, of colloid nature, and highly resistant to enzyme action. It exists in the blood as cholesterol and cholesterol esters, in nearly equal proportion, the latter resulting from union with fatty acids. According to Schoenheimer (quoted by Leary) cholesterol and viosterol are the only sterols which are absorbable. Herbivora are able to synthesize cholesterol, but the principal source of this substance, in the human being, is from the ingestion of such products as eggs, butter, cheese, milk, fried foods, liver, kidneys, oily fish, brain, soy bean, and pork fat. According to Gulli-Lindh Muller⁹ it is thought that the synthesis of cholesterol takes place in the entire reticuloendothelial system. An increase in blood cholesterol can be obtained by a diet rich in cholesterol-containing foods, especially when combined with some oily vehicle. Conversely, it can be lowered by a diet poor in such foods. Starling regards it as the framework or skeleton of the cell structure.

It seems reasonable, therefore, that at the onset of pregnancy there should be some mechanism whereby the mobilization of cholesterol might be effected, to supply the needs of the rapidly growing fetus. Mochlig and Ainslee¹⁰ injected rabbits with 1 c.c. of pituitary extract daily for ten days and found an increase in the blood cholesterol of 30 per cent in 85 per cent of the rabbits, and 14 per cent in 10 per cent of the rabbits. There was no change in 4 per cent of the rabbits.

According to Fluhmann,¹¹ Chauffard and his coworkers of the French School hold that cholesterol is actually manufactured by the cortex of the adrenals, aided by the corpus luteum, particularly in its retrogressive phase. The fact that Shiskin and Okey and Boyden found the blood cholesterol increased at the end of each menstruation, would seem to support this theory. Furthermore, Patrzek and Quinquaud found more cholesterol in the suprarenal vein than in the blood from other vessels. The German school holds that the suprarenals merely act as depositories and not as manufacturers of cholesterol. It is stated that

for the small increase in the total incidence of operative delivery in the group where the membranes were ruptured artificially.

TABLE V. A COMPARISON BETWEEN THE SPECIAL GROUP WITH RUPTURE OF THE MEMBRANES FOR INDUCTION OF LABOR AND THE WHOLE GROUP WITH ARTIFICIAL RUPTURE OF MEMBRANES

	WHOLE GROUP		SPECIAL GROUP	
	PRIMIPARAS	MULTIPARAS	PRIMIPARAS	MULTIPARAS
Length of labor	13.69 hr.	6.38 hr.	10.25 hr.	4.00 hr.
Temperature elev.	24%	9%	20%	15%
Incidence oper. del.	63%	21%	76%	23%
Percentage low for.	78%	65%	85%	88%
Percentage midfor.	6%	19%	10%	0
Percentage V and E.	12%	16%	5%	12%

A comparison of the special group of 59 cases in which the membranes were ruptured artificially before the onset of labor and the whole group of cases where membranes were ruptured artificially is shown in Table V. It is apparent that the figures for the group of cases in which the membranes were ruptured before the onset and for the induction of labor closely parallel those for the total group where the membranes were ruptured artificially regardless of the stage of labor. The length of labor in the special group was a little shorter and the incidence of temperature elevation and operative delivery about the same. The percentage of low forceps operations in relation to midforceps and version was a little higher.

The fetal mortality in the group of 59 cases in which the membranes were ruptured for the induction of labor at term consisted of one still-birth, a percentage of 1.7. This is almost identical with the general full-term fetal mortality at Harper Hospital for the year 1934 or 1.6 per cent. It appears, therefore, that deductions made from a study of the whole group of cases in which the membranes were ruptured artificially are not invalidated because of the variance in time of rupture of the membranes. Nor is there evidence here that artificial rupture of the membranes for induction of labor subjects mother or child to any additional danger.

lesion. He was of the opinion that the cholesterol crystals were separated from the oil droplets by intracellular lipolysis. The endothelial cells proliferated and enlarged greatly when phagocytizing these large oil masses and the nucleus was often displaced and flattened. The proliferative changes in the larger vessels led to an irregular thickening along one border of the lining, simulating the appearance of early endarteritis or thromboangiitis obliterans. A tortuous course of the vessel predisposed to localized proliferation and obliterative change. Wherever the introduced fatty material was in direct contact with the vessel wall, either by adherence or plugging, a localized proliferation resulted. The lung capillaries showed a greater frequency of cholesterol change, next to this the kidney, heart, and spleen. There was almost uniform splitting of the internal elastic lamina into multiple layers, but very little change in the media. Calcification occurred later. Fats alone are incapable of producing the proliferative change.

Duff¹⁵ states that the foam cells which accumulate within the intima in experimental cholesterol arteriosclerosis are almost certainly macrophages and resemble the large mononuclear phagocytes. The collections of cells form the yellow plaques which appear as the first lesions in the lining of the artery. Contrary to Klotz' opinion, he holds that the endothelium is apparently passive. Crystals of fusiform lipid material, resembling cholesterol, may be seen in the foam cells and in the intercellular ground substance. In experimental cholesterol feeding, twenty-five days are required for recognizable changes to appear. The lesions appeared earlier when the cholesterol was given in an oily or fat medium than when it was given dry. Apparently the fat aids in absorption partly in a physicochemical way and also by forming esters. *Experimental damage to the vessel wall through manipulations or slight cauterizations of the adventitial surface induced a much more abundant deposit of lipoids at the site of injury in the media of the artery and in a much shorter time, the lesion being recognizable in nine to fourteen days. It was found that lipid deposits did not occur in other undamaged portions of the artery even with considerable hypercholesteremia, but did occur in the damaged portions even with slight hypercholesteremia.*

In order to determine the character and degree of vascular change taking place during pregnancy, studies were made on placentas obtained from normal, preeclamptic, abruptio and eclamptic cases as to the character of the infarcts and supplemented by the usual clinical and laboratory investigations.

There were four eclamptic patients, three severe preeclamptic patients, and one case of abruptio placentae, all of whom were from the colored service of Grady Hospital. The cholesterol values in these cases varied from 200 to 266 mg., except in one case, a preeclamptic, whose value was 141 mg. The average cholesterol value was 212 mg. Albumin, casts, and high blood pressure were present in all. Fundus examination was done in seven cases and showed moderate to well-marked arterial spasms. Examination of the placentas showed one or more dark to light brown acute infarcts in all cases, which on microscopic examination showed necrotic or disintegrating villi with open intervillous circulation.

There were six mild preeclamptic patients, all of whom were white women and private patients. The cholesterol values in these cases varied from 174 mg. to 241 mg., the average value being 204 mg. One of these, a case of twins, showed a value of 222 mg. There was mod-

HEMOGLOBINURIA AS A SYMPTOM OF RUPTURED ECTOPIC PREGNANCY

W. T. POMMERENKE, M.D., ROCHESTER, N. Y.

(From the Department of Obstetrics and Gynecology, University of Rochester School of Medicine and Dentistry)

FORTUNATELY in a typical case of ruptured ectopic pregnancy, the history, symptomatology, and findings on examination are usually plainly indicative of the diagnosis. Still, in no small number of instances, in which the story and findings are less revealing, the problems of differential diagnosis assert themselves and frequently require a more exhaustive study to determine the true pathology. If what Robertson¹ says, "Hemoglobinuria will follow hemorrhage anywhere in the body," were true and generally known, then one might certainly expect to find in the medical literature an almost axiomatic relationship between hemoglobinuria and the hemoperitoneum which so frequently accompanies ruptured ectopic pregnancy. Although this relationship had doubtless not escaped the attention of numerous observers, there is a striking lack of emphasis or even mention of this correlation in many of the popular textbooks and journals of medicine.

So manifest was the occurrence of hemoglobinuria in a recent case of ruptured ectopic pregnancy that it seemed deserving of report. The apparent rarity of such a phenomenon also led to a more careful search for the presence of occult hemoglobin in cases showing no gross evidence of this pigment in the urine. It is not our purpose here to review all of the sparse literature on this subject, but rather to cite several publications and to present three cases with renewed emphasis on the study of the presence of hemoglobin in the urine.

lining of the vessels offer conditions ideal for spontaneous thrombosis and placental infarction, just as occurs in human coronary thrombosis and cardiac infarction with identical vascular changes.

Although Slemons and Curtis¹⁶ did not find hypercholesteremia constantly present in eclampsia, the fact that hypercholesteremia is present in the great majority of pregnancies and that vascular injury induces cholesterol change even with slight hypercholesteremia; the consistency with which cholesterol-like changes may be demonstrated in placental arteries; the marked predisposition to thrombosis or rupture which such vascular changes produce, either spontaneously or excited by the trauma of fetal movements; and the consistency with which acute infarcts may be demonstrated in preeclampsia, eclampsia, and abruptio placentae, afford exceedingly strong evidence that toxemia of pregnancy is a disease of placental autolysis, the basis of which is laid early in pregnancy by the hypercholesteremia of pregnancy.

Furthermore, the fundamental factor of hypercholesteremia may explain many hitherto puzzling facts. According to Gulli-Lindh Muller⁹ blood cholesterol is increased by a diet rich in cholesterol-containing foods, especially when combined with some oily vehicle, and, conversely, is lowered by a diet poor in these foods. Studies on blood cholesterol in the Dutch Indies show values far below those obtained in countries where animal products constitute the main part of the diet. May this not explain the low incidence of eclampsia in the tropics? Rosenthal and Patrzek¹⁷ found that hypocholesteremia accompanied the undernourishment during the war. The diet in Germany during the war was greatly deficient in fats and cholesterol-containing foods, and the low incidence of eclampsia in Germany during these years may well have been due mainly to this factor. Overweight people have been found to show hypercholesteremia.

A possible relation of certain other facts and symptoms of pregnancy occurs to one, on the basis of the hypercholesteremia of pregnancy. May it not be that the tendency to brain hemorrhage and the occasional occurrence of edema of the lungs in eclampsia, are favored by cholesterol-induced vascular changes in these organs, leading to weakening of the vessel walls, the actual rupture being due to the damaging effects of histamine? In studying the subsequent pregnancies of patients who have once had severe toxemia or eclampsia, the fact has been established that the incidence of toxemia or eclampsia is increased 25 per cent or more and that it lays the basis for cardiovascular renal disease which greatly shortens the expectancy of life.¹⁸ It is probable that the predisposition to toxemia of pregnancy in certain individuals is based on a hypercholesteremia both during and between pregnancies, according to the individual's diet, hyperpituitarism, or hypothyroidism, as high cholesterol values have been found to persist for many months after pregnancy.⁸

Physical Examination.—The patient appeared undernourished. Temperature, pulse, and respiration were normal. The abdomen showed diffuse tenderness, most marked in the right lower quadrant, along with true muscular spasm. The vagina contained fresh blood. The uterus could not be outlined because of tenderness. In the culdesac a large, soft, tender mass was felt.

Laboratory Findings.—Wassermann negative. W.B.C. 28,900. Urine: clear, acid, sp. gr. 1.020; albumin faint trace; glucose 0; sediment, normal. Gross hemoglobin 0. Spectroscopic examination showed the typical absorption bands of hemoglobin.

At the time of examination, the diagnosis of postabortal pelvic abscess seemed likely. However, shortly after the pelvic examination the patient went into shock. The blood pressure fell rapidly from 110/70 to 85/40. Pulse rose from 72 to 126.

A posterior colpotomy was performed with escape of blood. At laparotomy the diagnosis of ectopic pregnancy, with tubal abortion, right, was established. The fresh and old blood, amounting to some 400 c.c. in all, was aspirated, and the right tube was removed.

Laboratory findings on the second postoperative day: R.B.C. 3,560,000; Hb. 9.6 gm. per cent. Icterus index 5. No hemoglobin could be detected on spectroscopic examination of the urine. The postoperative course was unremarkable, and the patient was discharged on the fourteenth day.

CASE 3.—M. McC. (No. 100016). This thirty-year-old nulliparous woman was admitted to the hospital three and a half hours after the onset of intense pain in the lower abdominal and epigastric regions. There was no nausea or vomiting. The menstrual periods had always been very irregular, the interval varying from three to eight weeks. Her last menstrual period had occurred five weeks prior to the present illness. Slight vaginal spotting occurred on the day preceding admission. When examined, the patient was very pale and showed evidence of critical shock. Blood pressure was 60 systolic. The pulse at the wrist was imperceptible. The abdomen was diffusely tender. A tender bulging mass occupied the culdesac. The uterus was exquisitely tender on motion. The appendages were not outlinable due to pain.

as follows: Early in pregnancy the placental hormone stimulates the pituitary gland which apparently controls cholesterol metabolism. The resulting hypercholesteremia may be further increased if there is an associated hypothyroidism or if the diet contains an unusual amount of cholesterol-containing foods. Secretion of some of the excess cholesterol through the bile probably produces nausea and vomiting of pregnancy. By the third or fourth month of pregnancy, the process of storage of cholesterol is probably well under way. The resulting diminution in secretion of cholesterol through the bile brings about relief from nausea and vomiting. If there is excessive storage in the liver, excessive fatty change in the outer zone and even necrosis and disintegration in the cells of the inner zone of the lobules take place. If the amount of cholesterol secretion through the bile, or storage in the liver is not of sufficient degree to cause excessive or possibly pernicious vomiting of preg-



Fig. 5.—Section of liver from case of pernicious vomiting, showing marked fatty infiltration in mid and outer zones of liver lobule. Appearance is that of cholesterol lipoid change.

nancy, the slow-developing cholesterol-induced change in the placental arteries, lays the basis for toxemia of the later months of pregnancy, through the liability to placental infarction, occurring either spontaneously or from the trauma of fetal movements on the unprotected vessels, causing thrombosis or even sudden rupture, followed by acute infarction and autolysis of the affected placental tissue. The poisonous protein split products, mainly peptone, guanidine, and histamine, diffuse into the maternal circulation causing preeclampsia, eclampsia, or abruptio placentae, depending on the rapidity of autolysis and the location and actual amount of infarcted tissue. It is probable that certain pathologic changes in other organs, particularly the kidneys, brain, and lungs, so often associated with toxemia, are predisposed to by cholesterol-induced vascular changes in these organs. It would certainly seem that the so-called deficiency of the liver which exists throughout preg-

SUMMARY

Hemoglobin in the urine would be more frequently encountered if one would search for it. The importance of chemical and spectroscopic tests is stressed. Hemoglobinuria is a not infrequent accompaniment of ruptured ectopic pregnancy with intraabdominal hemorrhage, and may be a significant symptom of the disease. Therefore, whenever the possibility of a ruptured ectopic pregnancy is considered in the differential diagnosis, the appearance of hemoglobinuria should be determined and evaluated in the presenting syndrome.

REFERENCES

- (1) *Robertson, Hugh*: Am. J. Surg. 14: 395, 1931. (2) *Nikolski, N. W.*: Zentralbl. f. Chir. 7: 315, 1880. (3) *Michaelis, Leonor*: Deutsche med. Wchnschr. 27: 51, 1901. (4) *Schottmüller, H.*: München. med. Wchnschr. 61: 230, 1914. (5) *Norris, Edgar*: Surg. Gyneec. Obst. 31: 34, 1920. (6) *DeLee, J.*: The Principles and Practice of Obstetrics, Philadelphia, 1933, W. B. Saunders Co. (7) *Da Costa, John C.*: Examination of the Blood, Keen's Surgery 1: Philadelphia, 1919, W. B. Saunders Co. (8) *Manwell, E. J., and Whipple, G. H.*: Am. J. Physiol. 88: 420, 1929. (9) *Lichty, J. A., Jr., Havill, W. H., and Whipple, G. H.*: J. Exper. Med. 55: 603, 1932. (10) *Hertzer, A. E.*: The Peritoneum 1: St. Louis, 1919, The C. V. Mosby Co., p. 21.

TREATMENT OF SENILE VAGINITIS WITH ESTROGENIC HORMONES

ADOLPH JACOBY, M.D., F.A.C.S., NEW YORK, AND BENJAMIN RABBINER, M.D., F.A.C.S., BROOKLYN, N. Y.

(From the Department of Gynecology, Post Graduate Medical School and Hospital, Columbia University)

THE effect of the ovarian hormone on the vaginal mucosa has been shown in animals both immature and adult.

Stockard and Papanicolaou¹ first described the cyclic changes occurring in the vaginal mucosa in immature rodents under the stimulation of estrogenic hormones. Allen² demonstrated that estrin when injected into immature monkeys caused vast proliferation of the layers of vaginal mucosa. Mazer and Ziserman³ demonstrated that injections of estrin in spayed rodents produced growth and vascularity of the uterus and the vagina.

Davis and Hartman⁴ studied the cyclic changes in the vagina in monkeys and found that the epithelium attains its greatest thickness in the midinterval, consisting at this time of an active basal layer, an inactive functional layer, and an intra-epithelial zone of cornification interposed between these two which is called Dierks' layer. Following ovulation, desquamation begins and proceeds by a crumbling away of the functionalis which is usually not completely destroyed. Mitosis begins in the basalis on the first day of menstruation, becoming most marked near the time of ovulation. A cessation of ovarian activity such as is seen in the menopause definitely alters these physiologic changes.

Papanicolaou and Shorr⁵ showed that the injection of ovarian follicular hormones in women with ovarian deficiency following oophorectomy or menopause caused the

him certain indisputable facts upon which the theory rests. Placentas from patients free from toxemia do not show the acute type of infarct. Placentas from patients affected with preeclampsia, eclampsia, and abruptio placentae rarely fail to show recognizable areas of acute infarction, if prepared and sectioned in the proper manner. The size of the infarcted area bears a definite relation to the severity of the toxemia, modified to some extent by the acuteness of the process. The location of the infarct determines to a considerable extent whether the toxemia will be manifest as eclampsia or abruptio placentae. The manifestations of eclampsia, both clinical and pathologic, can be produced by injecting autolysate of placental tissue into guinea pigs. The consistency with which hypercholesteremia occurs in pregnancy and cholesterol-like changes can be demonstrated in the placental arteries, furnishes a definite predisposing cause of thrombosis or rupture of the placental arteries. The trauma of fetal movements acts as the exciting cause.

Recognizing the fact that the artificial production of eclampsia by inducing placental infarction through blocking the circulation in a placental artery would establish beyond doubt that eclampsia is a disease of placental autolysis, one of us (R. A. B.), working with Dr. E. D. Colvin, attempted to produce infarction in the placentas of pregnant bitches and rabbits by injections of a small amount of hot oil or saline solution, hoping that an artery crossing the injected area might be thrombosed, and cause infarction and autolysis beyond the injected area. Convulsions occurred in a bitch, during labor, several days after injection, but in the majority of cases, the animal aborted within one to two days, before toxemia could develop.

According to Page and Bernhard²⁰ and Duff,¹⁵ the administration of iodine or thyroid extract, along with cholesterol, will prevent the characteristic vascular changes in the coronary arteries in rabbits. This suggests the possibility of therapeutic use of iodine or thyroid extract, especially during the last half of pregnancy, to prevent excessive cholesterol storage in the placental arteries. It also suggests a more practical application of basal metabolism determinations in pregnancy. Furthermore, it would seem advisable to restrict fats and cholesterol-containing foods in pregnancy.

As progress is made toward a better understanding of the cause, nature, and effects of the hypercholesteremia of pregnancy, there will no doubt develop a better understanding of the fundamental cause of hypertension in general, and the causes which lead to arteriosclerosis and cardiovascular renal disease.

CONCLUSIONS

1. The hypercholesteremia of pregnancy is probably a normal physiologic response to meet the requirements of rapid cell growth in the fetus and prepare for lactation.

Sixteen patients were treated by injection alone, over a period of from one to seven months; the average time under treatment was three and one-half months. During the time from 2,000 to 70,000 international units were used. The average dosage was 24,000 international units.

No douches or other treatments were combined with the use of the estrogenic hormones.

The results of treatment were as follows:

METHOD	MOUTH	INJECTION	BOTH
Number of patients	3	16	6
Cured	3	6	2
Improved, symptoms only	—	5	1
Improved, signs only	—	0	0
Improved, both	—	4	3
No improvement	—	1	—
Relapse, 12 patients	1	6	5
Relapse, symptoms only	—	2	—
Relapse, signs only	—	1	—
Relapse, both	1	3	5

The eleven patients who were cured had a complete disappearance of all symptoms as well as a restoration of the mucosa to normal appearance.

All but one of the remaining patients were relieved of the distressing itching, burning, and discharge.

Relapses occurred in twelve patients from one to five times within a week to five weeks after discontinuing treatment. Renewed improvement followed resumption of treatment.

The one patient who failed to show any improvement under treatment had an adhesive vaginitis.

DISCUSSION AND SUMMARY

It has been shown that the estrogenic substances produce a cyclical change in the vaginal mucosa even after the menopause.

From the results of treatment of senile vaginitis with these substances, it is evident that the shedding and reformation of the mucosa eliminates the underlying pathology present in vaginitis. The normal mucosa thus produced is better able to resist those factors, whether of infectious or atrophic character, which cause the vaginitis. In this way a cure is brought about.

Even when a cure is not complete, the relief of symptoms justifies the use of estrogenic substances in the treatment of senile vaginitis.

REFERENCES

- (1) Stockard, Charles R., and Papanicolaou, G. N.: *Am. J. Anat.* 22: 1917. (2) Allen, Edward: *J. Morph. & Physiol.* 46: 479, 1928. (3) Mazer, C., and Zisman, A. J.: *M. J. & Rec.* 135: 35, 1932. (4) Davis, M. Edward, and Hartman, Carl: *J. A. M. A.* 104: 279, 1935. (5) Papanicolaou, G. N., and Shorr, E.: *Proc. Soc. Exper. Biol. & Med.* 32: 385, 1935. (6) Kaufman, C.: *Ztschr. f. Geburtsh. u. Gynäk.* 110: 78, 1934. (7) Lewis, Robert M.: *AM. J. OBST. & GYNEC.* 26: 593, 1933. (8) *Idem*: *AM. J. OBST. & GYNEC.* 29: 806, 1935. (9) Brown, Joseph: *J. A. M. A.* 102: 1293, 1934. (10) Te Linde, R. W., Brawner, James N., Jr.: *AM. J. OBST. & GYNEC.* 30: 512, 1935.

FETAL BLOOD STUDIES*

V. THE RÔLE OF ANESTHESIA IN THE PRODUCTION OF ASPHYXIA NEONATORUM

NICHOLSON J. EASTMAN, M.D., BALTIMORE, MD.

(From the Department of Obstetrics, the Johns Hopkins University and Hospital)

THERE occur occasional cases of asphyxia neonatorum in which the obstetrician, for want of other explanation, incriminates the anesthesia given at the time of delivery. The studies of Leake,¹ of Ronzoni,² of Raginsky and Bourne,³ and of others, indicate that in adults the common inhalation anesthetics produce decided changes in the acid-base balance of the blood and that nitrous oxide oxygen mixtures regularly cause varying degrees of anoxemia. It has been argued, indeed, that nitrous oxide owes its anesthetic effect largely to the associated anoxemia rather than to any intrinsic anesthetic quality.⁴ The obstetrician has every reason to suspect that these blood chemical alterations extend to the child in utero, possibly with harmful effect, but actual studies of the question have been lacking. It has seemed to us that much of practical value might accrue if quantitative data were available, showing the effect of maternal anesthesia upon those constituents of the child's blood most directly concerned with the onset of respiration, particularly the oxygen content. To this end the present study was undertaken.

METHODS

With the mothers under various kinds of anesthesia, samples of umbilical cord blood were secured in the following manner. Immediately after the birth of the child, before the delivery of the placenta and prior to the onset of respiration, two Kelly clamps were placed on the cord close to the vulva and a second pair a few inches from the baby, all four clamps being applied as nearly simultaneously as possible. By cutting between the clamps at the two ends of the cord, a segment of cord about 12 inches long was usually obtained, tightly clamped at either end, and containing in its vessels enough blood for gas analysis. As soon as the piece of cord was obtained, blood samples from the umbilical artery and vein were drawn, the usual precautions being taken to protect the blood from contact with air and to prevent clotting. The oxygen analyses were carried out by the standard method of Van Slyke and Neill.⁵

The maternal blood specimens were taken from the arm vein and radial artery, as nearly as possible at the moment of delivery, the radial artery punctures being preceded by a local injection of novocaine.

In all, forty babies delivered under anesthesia were studied; in four cases the anesthetic was chloroform, in eight cases ether, and in twenty-eight cases nitrous oxide oxygen in various proportions. In addition, the bloods of fifteen infants delivered without anesthesia were analyzed as controls.

*Read, by invitation, before the Society of the Alumni of the Sloane Hospital for Women, November 1, 1935.

As paraldehyde has become widely used in the past few years as an obstetric analgesic, the authors would like at this time to caution those who are employing this drug to be extremely careful as to its source and the method of dispensing. The similarity of names "paraldehyde" and "formaldehyde" offers a potential source of error which must be carefully guarded against.

The mortality and morbidity figures given above represent the total uncorrected results. Obviously the fatal case was not due to the mid-forceps delivery, but it was an obstetric death and must be classified as such. The morbidity in this series follows the standard suggested by the American College of Surgeons, which demands that a patient should be considered febrile if a temperature of 100.4° F. appears on any two consecutive days, excluding the first. May we add that in this series temperature readings were recorded at 8 A.M., 12 Noon, 4 and 8 P.M. It will be seen that the great majority of the patients in this group were discharged from the hospital within two weeks after delivery, and that six or 1.23 per cent required more than two weeks' hospital care.

Any attempts at giving corrected maternal mortality and morbidity figures are filled with danger. There still exists a great difference of opinion in regard to reporting such figures, and many obstetric clinics have their own standards. The medical profession is looking forward to the time when a uniform method of reporting maternal mortality and morbidity statistics is adopted. Certainly the recent publications of Adair,² Stander,³ Ward, Goff, and Aldridge,⁴ and others have shown conclusively that such a uniformity is absolutely necessary if any value is to be placed on any reported statistics. In this series, therefore, no correction has been attempted. Cases of mastitis and infection of the urinary and respiratory tracts are reported simply as febrile.

✓ TABLE I. INFANT MORTALITY

<i>Midforceps</i> (178)		4, or 2.24%
Stillborn with intracranial hemorrhage	1	
Intracranial hemorrhage, death on sixth day	1	
Monster	1	
Macerated	1	
<i>Low Forceps</i> (390)		9, or 2.30%
Stillborn with intracranial hemorrhage	1	
Intracranial hemorrhage	2	
Death on second day	1	
Death on fourth day	1	
Prematurity	3	
Monster	1	
Macerated	2	
Total Infant Mortality 13, or 2.28%		

The infant mortality given above represents the total uncorrected results. We believe in what Stander³ has recommended, "that fetal mortality rates should be reported as total infant mortality by which is meant all babies weighing 1,500 gm. or over, or measuring 35 cm.

fetus, conveyed to it through the umbilical vein, is low in oxygen as compared with that of the mother. At birth, in fact, its arterial blood contains on an average even less oxygen than the blood of the maternal arm vein. The low oxygen content of the umbilical vein blood becomes more striking if, instead of referring to the quantity of oxygen present in volumes per cent (e.e. of gas per 100 e.e. of blood), we express it as a percentage of the total amount of oxygen with which the blood will combine; or, in other words, in terms of percentage saturation. It will be seen then that while the arterial blood of the mother is usually 95 per cent saturated with oxygen and the maternal venous blood about 71 per cent saturated, the arterial blood going to the fetus at the moment of birth is only 50 per cent saturated with oxygen. A relatively large quantity of oxygen is given off by the arterial blood as it passes through the

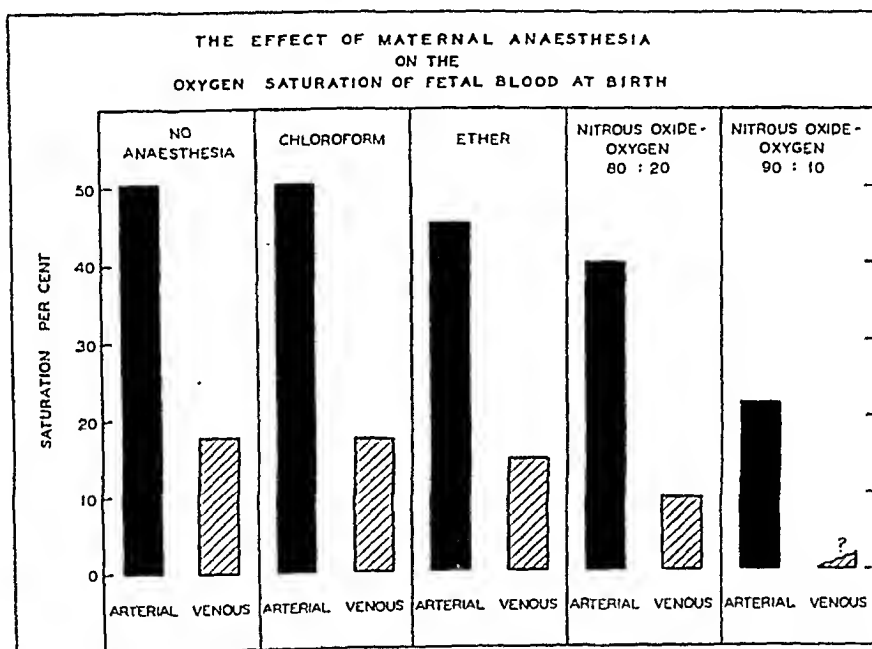


Chart 2.—Showing the average oxygen saturation of fetal blood at birth with the mothers under various kinds of anaesthesia.

fetus, so that the venous blood returning from the fetus contains on an average only 3.3 volumes per cent of oxygen, a percentage saturation of less than 20 per cent. These figures represent the oxygen saturation of the arterial and venous bloods of infants born without anaesthesia and are shown again, for comparative purposes, in the first two columns of Chart 2.

In the four cases of chloroform anaesthesia, two of them low forceps deliveries and two spontaneous, no appreciable effect could be noted on the oxygen saturation of the fetal blood. This is in keeping with two well-known facts: first, since large quantities of air are given with chloroform, maternal anoxemia is not likely to result; second, since it is not highly irritating, the passage of air from the upper respiratory tract of

We deliver by low or outlet forceps all heads which reach the perineum, and we perform perineotomies whenever a perineum is present.

CONCLUSIONS

1. The use of forceps need not add to obstetric morbidity or mortality, maternal or fetal.
2. Only through the publishing of uncorrected statistics by all authors may comparable reports be obtained.

REFERENCES

- (1) *Kane, H. F., and Roth, G. B.*: AM. J. OBST. & GYNEC. 29: 366, 1935. (2) *Adair, Fred L.*: AM. J. OBST. & GYNEC. 29: 384, 1935. (3) *Stander, H. J.*: AM. J. OBST. & GYNEC. 28: 421, 1934. (4) *Ward, G. G., Goff, B. H., and Aldridge, A. A.*: Bull. Am. Col. Surg. 19: 9, 1935. (5) *Caldwell, W. D., Moloy, H. C., and D'Esopo, D. A.*: AM. J. OBST. & GYNEC. 28: 482, 1935; idem 28: 824, 1934.

1835 EYE STREET, N. W.

ADENOCARCINOMA OF SUPERNUMERARY BREASTS OF THE LABIA MAJORA IN A CASE OF EPIDERMOID CARCINOMA OF THE VULVA*

HARRY J. GREENE, M.D., BROOKLYN, N. Y.

(From the Gynecological Service of Kings County Hospital)

BREAST tissue in the labia is rare. Adenocarcinoma of breast tissue of the labia has not been reported. The presence of epidermoid carcinoma in the same area makes this case an outstanding one, since two types of cancer are found in the same individual.

Of the many cases of aberrant breast tissue reported, only seven have been reported involving the labia. Hartung¹ in Germany in 1872 reported the first case in a young girl who presented herself with a small pedunculated mass attached to one of the labia and secreting a milky fluid. This tissue was removed and found to be breast tissue. DeBlasio² in Italy in 1905 reported a case where a young girl had nipples on each labium, and at puberty large masses developed into breast tissue, which became larger with each pregnancy. Bell³ in 1926 reported a case that came to him following an accident to the vulva. A swelling occurred and it was thought to be a boil because it was always discharging milky fluid. Its removal proved to be breast tissue. Three years later the patient came back with extensive epidermoid carcinoma of the vulva. Purvis⁴ in England in 1927 reported a case where the patient had her breasts removed in early adolescence. Later on when she became pregnant she developed masses in the labia. The removal proved them to be breast tissue. McFarland⁵ in 1931 reported a case of mammary gland of the labia proved by section. Fridel⁶ in Germany in 1932 reported a case of aberrant breast tissue in the right labium which had undergone changes to fibroadenoma. A recent case is one reported by Mengert⁷ in June, 1935. A small tumor was discovered during a routine prenatal examination. Following delivery and with the arrival of the milk, this mass became larger, and removal proved it to be breast tissue.

*Presented at a meeting of the Brooklyn Gynecological Society, October 4, 1935.

returning from the fetus in the umbilical arteries was likewise low in oxygen. It is thus clear that in the average case nitrous oxide oxygen anesthesia causes a considerable reduction in the oxygen content of the fetal blood, particularly when used in operative obstetrics. However, these average figures give us little insight into individual cases and fail to answer the important question, Does the anoxemia thus produced ever reach such levels as to endanger the child? This query can be met only by reviewing the figures which make up the averages set forth in the diagram.

In Chart 3 are shown the details of those cases in which the nitrous oxide oxygen mixtures approximated 80:20 proportions. In general, the bloods of these mothers showed only slight decreases in oxygen saturation, but in two instances, Cases 3 and 8, substantial reductions were

CASE NO	AGE	PARTY	GAS MIXTURE APPROX.	DURATION MINUTES	MATERNAL CYANOSIS	OXYGEN SATURATION OF BLOOD				ASPHYXIA
						MOTHER		CHILD		
						ARTERIAL	VENOUS	ARTERIAL	VENOUS	
1	19	I	85 : 15	12	NONE	% 76.7	% 49.4	% 25.2	% 10.1	NONE
2	27	II	90 : 10	20	SLIGHT	67.3	-	9.8	-	MODERATE
3	20	II	95 : 5	11	NONE	-	-	13.1	-	SLIGHT
4	22	I	85 : 15	18	NONE	80.9	-	31.7	-	SLIGHT
5	30	III	95 : 5	21	SLIGHT	69.1	-	10.3	-	MARKED
6	19	II	85 : 15	18	NONE	74.1	-	25.5	-	NONE
7	32	I	85 : 15	15	NONE	81.0	51.7	29.7	13.0	NONE
8	25	I	85 : 15	10	NONE	-	-	32.8	17.1	NONE
9	26	I	95 : 5	16	MARKED	49.2	-	11.7	-	SLIGHT
10	18	II	85 : 15	8	NONE	73.2	-	33.4	-	NONE
11	21	I	85 : 15	10	NONE	-	-	41.2	22.2	NONE
12	22	I	90 : 10	18	SLIGHT	66.8	40.4	17.1	-	NONE
CASES 1 - 8 CESAREAN SECTION. CASES 9 - 12 FORCEPS DELIVERY						AVERAGE		23.5		

Chart 4.—Showing the details of twelve cases in which nitrous oxide oxygen was administered for obstetric anesthesia.

observed and in both of these mothers a slight degree of cyanosis was noted. The arterial bloods of the infants in this group were characterized by rather wide variations in their oxygen saturation, the figures varying from 25.1 to 51.3 per cent. Previous observations, however, indicate that even oxygen saturations of 25 per cent are readily withstood by infants at birth, the typical case of severe asphyxia neonatorum showing a figure below 10 per cent. It would thus appear that nitrous oxide oxygen mixtures, given over short periods for analgesic purposes, do not produce a deleterious degree of fetal anoxemia. The same, however, cannot be said when stronger concentrations of the gas are administered for longer periods of time. As shown in Chart 4, when the proportions approximate or exceed 90:10 and are maintained for over ten minutes, both mother and child may manifest marked decreases in the

is present a newgrowth extremely disorderly in architecture. Primarily it is adenomatous, but in some areas it shows scirrhus type of growth. The neoplasm is malignant'' (Fig. 2).

Biopsy Diagnosis.—Adenocarcinoma of breast tissue. Some normal islands of breast tissue. "Section shows a newgrowth which is of epidermoid type; there are numer-

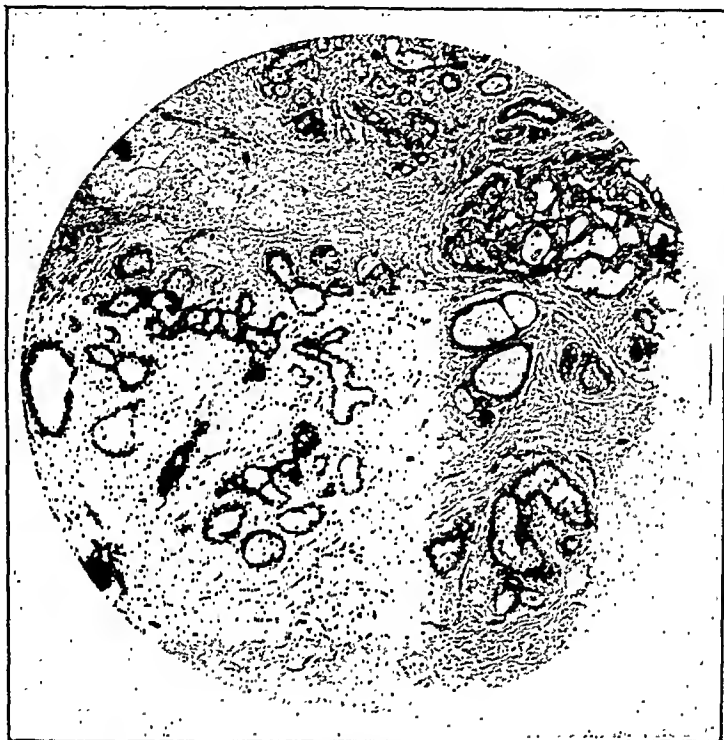


Fig. 2.—Section from tumor on right labia, showing malignant changes in the acini of breast tissue.

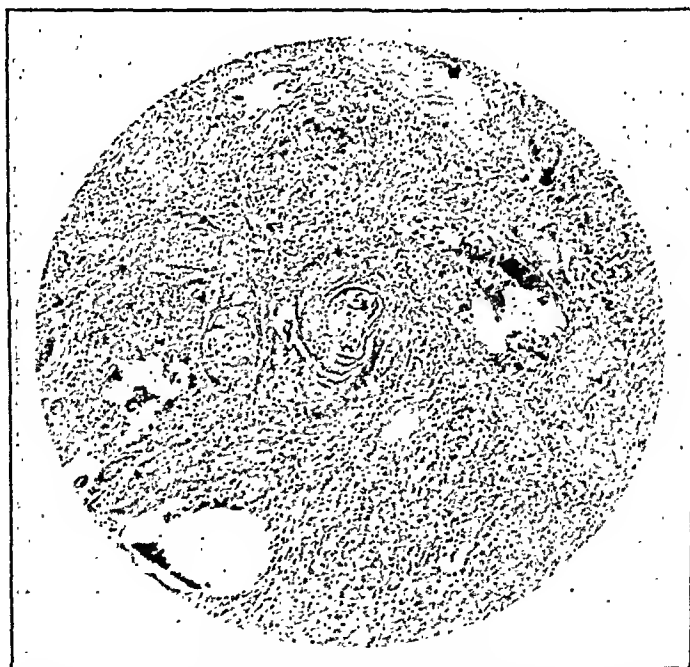


Fig. 3.—Section from remaining rectovaginal septum, showing epidermoid type of new growth and pearl formation.

carded, but if severe asphyxia ensued the umbilical blood was analyzed for oxygen. Naturally, such samples of blood sometimes came from cases of cerebral hemorrhage or congenital defect, but over a period of years five cases have been collected in which there was no demonstrable organic cause for the baby's inability to breathe. Some details of these five cases are shown in Chart 5. In the first two cases, the babies died after prolonged artificial respiration and autopsy revealed no explanation for the deaths. The anesthesia mixtures used in these two instances were 95 per cent nitrous oxide and 5 per cent oxygen; in Case 1 the administration of the anesthetic was said to have been very "troublesome" with marked maternal cyanosis resulting. The exceedingly low figure for the oxygen saturation of the arterial blood of the infant in Case 1 was doubly checked and indicates that all oxygen combined with hemoglobin had disappeared, leaving only a negligible quantity in solution in the serum. In Case 2 the arterial blood of the infant was likewise almost depleted of oxygen. Although the babies in the remaining three cases survived, they showed the picture of profound asphyxia neonatorum and required prolonged resuscitation. The highest arterial oxygen saturation in these five infants was 10.4 per cent and the average was 6.7 per cent. The latter figure is equivalent to about one volume per cent of oxygen or approximately one-tenth of the amount found normally at birth and one-twentieth that present in the arterial blood of the adult. As usual in severe asphyxia neonatorum, the umbilical arteries were completely collapsed.

COMMENT

The results of this study would seem to justify the conclusion that nitrous oxide oxygen anesthesia, administered to the mother in concentrations sufficient for operative obstetrics, *occasionally* reduces the oxygen content of the umbilical blood to extremely low levels. Lack of oxygen kills tissues as quickly as many active poisons, and it is only reasonable to assume that such levels of anoxemia as we have described exert harmful and even fatal effects on the child at birth. This assumption, indeed, is implied in our very term asphyxia neonatorum. But it is seldom recalled in viewing a grave case of asphyxia at birth, with the slow heart rate, the cold, white body, and the limp extremities, how precisely, how completely the clinical picture duplicates the reaction of any organism to anoxemia. In experimental animals, as well as in man, anoxemia has been the object of intensive study for over half a century. But, whether we consider the studies of Klug of Germany in 1883,⁶ of Lewis and Mathison of London in 1910,⁷ or of Greene and Gilbert of the United States in recent years,⁸ the results are the same; on few subjects has there been such complete agreement, for experimental anoxemia produces a constant, clear-cut train of phenomena which may be reduplicated in the laboratory at will. The sequence of events may be described

One patient, fifty years of age, was completely relieved of incapacitating headaches, hot flashes, etc., which developed fourteen years after a supravaginal hysterectomy in the course of which the ovaries were preserved. This patient and one of the radium patients strengthen the belief that a secondary physiologic menopause occurs at the normal age in women whose ovaries were conserved in the course of



Fig. 1.—Section of ovary from woman sixty-two years old. $\times 6$.



Fig. 2.—Section of ovary from woman sixty-two years old. $\times 25$.

a hysterectomy performed at a relatively early age and also in women whose ovaries were irradiated by radium or x-ray at a relatively early age.

Ten of the eighteen women treated believe their vasomotor disturbances were improved by the use of emmenin. Eight of the ten were very positive in their statements; two were rather unconvincing. The eight positive results may be summarized as follows:

watch these fetal respiratory movements closely, and they find that their rate increased during the latter part of pregnancy from a very slow one to about 60 per minute at term. Although their studies are not yet complete, they have permitted me to say that the effect of maternal anoxemia on these movements is clear-cut. As the oxygen supply to the mother is diminished, the rate of the movements becomes slower and with extreme anoxemia they stop. If now, the fetuses are delivered at term under these circumstances, the onset of respiration either fails or is much delayed.

In interpreting the results of our study in terms of practical anesthesia in the delivery room, considerable caution is necessary. Certainly, the skill and judgment of the anesthetist and the behavior of the individual patient enter so largely into the problem that hard and fast rules are impossible. A few generalizations, however, would seem permissible. In the first place, it should be emphasized that chloroform, despite its benign effect on the child, has proved too dangerous to the mother to have an important place in operative obstetrics. Since ether passes readily through the placenta, it must exert considerable anesthetic effect upon the child, and we believe it is due to this influence and not to anoxemia that the occasional "etherized" baby is slow in starting to breathe. Provided there is no cerebral injury, however, we find that these infants react well to time and gentle stimulation. Certainly in our opinion, their prognosis is immeasurably better than those in which the apnea is the result of profound anoxemia. Our figures show clearly that nitrous oxide oxygen anesthesia for periods of less than five minutes and in proportions of 85:15 or weaker, does not cause a harmful degree of anoxemia. The time element here is most important and pure nitrous oxide, administered for four or five breaths to produce analgesia, probably causes less anoxemia than a mixture of 85:15 continued for five minutes. But it is on the problem of anesthesia in operative obstetrics that our study would seem chiefly to bear. Here it seems plain that when nitrous oxide oxygen is given in concentrations of 90:10 or stronger over periods which exceed five minutes, marked degrees of anoxemia are produced in about one baby out of every three. The anoxemia may not prove harmful, it is true, but in the exceptional case, as we have shown, it may be associated with profound and even fatal asphyxia neonatorum. It is not intended by this statement to exclude nitrous oxide oxygen from the field of operative obstetrics. The criticism is only of the very concentrated mixtures given without ether for periods which exceed five minutes. An adequate saturation of the fetal blood with oxygen can be guaranteed only if the mother receives fifteen parts of oxygen in every 100 parts of the gas mixture, and to satisfy this end, ether should be added to the gas mixture if the latter, in proportions of 85:15, does not suffice. After prolonged labors, in particular, babies seem to withstand anoxemia poorly, and if an operation is necessary in

SUMMARY

1. Emmenin liquid (complex type) was given to eighteen women complaining of the vasomotor disturbances of the menopause.

2. Ten of these women were improved; eight very definitely, two rather indefinitely.

3. In the eight patients definitely improved, treatment was instituted soon after the onset of symptoms (from one to seven months). In two of them, the menopause was surgical, following supravaginal hysterectomy and bilateral salpingo-oophorectomy.

REFERENCES

(1) *Collip, J. B.*: *Canad. M. A. J.* 22: 212, 1930. (2) *Campbell, A. D., and Collip, J. B.*: *Canad. M. A. J.* 23: 633, 1930.

701 MEDICAL ARTS BUILDING

DISCUSSION

DR. WINIFRED B. STEWART.—My views are in accord with those of Dr. Macfarlane. My experience, however, has been chiefly with the abnormal mental manifestations of this period, which, as is well known, vary greatly in both severity and duration. Irritability, nervousness, and mild depression are very common. Anxiety states, emotionalism, feelings of inadequacy and acute depressions attended by suicidal tendencies also occur, and delusional states, particularly those of infidelity, are frequently encountered. These psychoneurotic and psychotic states of middle life are no longer thought to be a distinct clinical entity. As in other periods of life, the personality type of the individual determines the type of psychosis.

Insanity is a state of mental decompensation which may be caused by any one of a number of endogenous or exogenous factors. The psychoses of the menopause are probably a result of the endocrine imbalance which occurs at this period and therefore the use of suitable endocrine substances is believed by many investigators to be the rational form of treatment. Recent advances in endocrinology have contributed products which seem to be far more efficacious for this purpose than the extracts formerly at our disposal. Within the past two years, Severinghouse reported good results with folliculin in the treatment of mental symptoms of the menopause and Werner and associates used theelin with encouraging results in a large series of involutional psychoses in Missouri City and Missouri State Hospitals.

I have employed emmenin in the treatment of five cases, four of which were definitely improved. However, none of these four was committably insane. Three were treated relatively soon after the onset of symptoms. One patient, treated eight years after a bilateral oophorectomy, theoretically should not have been benefited, but showed definite improvement.

While these results are very encouraging, in order properly to evaluate the relative efficacy of this form of treatment, it will be necessary to study a larger series of cases, preferably under institutional supervision.

THE PERIOD OF PUBERTY AND THE INCEPTION OF MENSTRUATION*

C. F. FLUHMANN, M.D., C.M., SAN FRANCISCO, CALIF.

*(From the Department of Obstetrics and Gynecology, Stanford University
School of Medicine)*

THE age of puberty represents a very critical time in the life history of every young woman. It is a period which eventuates into maturity, and it is accompanied by a number of important changes in the organs of internal secretion, by the development of the secondary sexual characters, by the cessation of increase in stature and by a psychic transformation. The beginning of menstruation, the menarche, is also a striking event at this time, and a number of menstrual disorders are particularly prone to occur during the first few years. In order to understand the full significance of these disturbances it is necessary to consider a number of important facts which deal with the relation of the menarche to other events of the pubertal age, as well as to appreciate the wide variations in the character of the early menstrual periods which may occur under normal conditions.

AGE AT ONSET OF MENSES

Since the days when Brierre de Boismont first made a statistical study of the age of onset of puberty and computed an average figure, this problem seems to have possessed a peculiar fascination for a large army of clinical investigators. The literature abounds with scores of studies, many based upon thousands of subjects, but most unfortunately valueless for purposes of comparison and also open to doubt as to their scientific accuracy. This is due in great part to the prevalent method of obtaining the ages of the subjects, which depends usually on the doubtful recollections of adult women questioned by junior assistants in large gynecologic clinics. Although a number of studies based on the careful observation of schoolgirls are now available, the series are not large, and, as Kennedy¹ points out, the sampling error in such groups is too great to allow the figures to represent any final conclusion. The different ways of expressing age classes by various authors also render many of the reports useless for comparison with one another.

*Address delivered before the Harbor Branch of the Los Angeles County Medical Society, Long Beach, California, October 25, 1935, and the San Francisco Bay Counties Obstetrical and Gynecological Society, February 14, 1936.

Any of the above described conditions could serve as a necessary reflex stimulus to the constrictor fibers of the bronchioles. None of the available literature reports this condition as a complication of parturition. One such case was observed in the Hackensack Hospital in 1932. Radiographic studies confirmed the complication in this case.

Personal communications from leading obstetricians in the United States failed to disclose any experience in this field.

CASE REPORT

This patient (Case No. 28395), a negress aged twenty-one years, was admitted to the Hackensack Hospital, 11:30 P.M., March 25, 1932, having irregular uterine contractions every fifteen to twenty minutes. She was first seen in the Out-Patient Department of the hospital, Jan. 20, 1932. Her medical and physical history are essentially negative. Present pregnancy, which was her first, showed no abnormality except occasional attacks of nausea in the morning which persisted throughout her

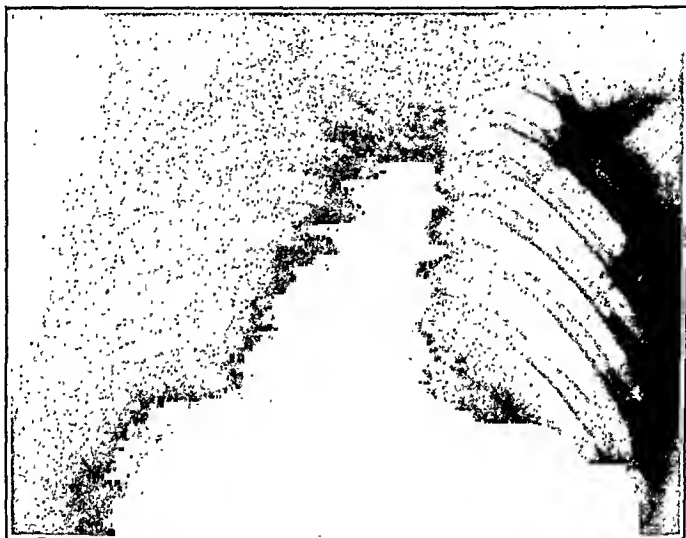


Fig. 1.—First examination, thirty-two hours after delivery. Considerable diminution of illumination of upper lobe and moderate diminution of illumination of middle and lower lobes of right lung, lung markings faintly visualized, narrowing of right chest, and moderate retraction of heart to right. Compensatory emphysema of left lung.

pregnancy, and she complained some of slight swelling of the feet during the last month. Her last menstruation was June 15, 1931; date of expected confinement, March 22, 1932. Physical examination revealed a well-developed and well-nourished female. The tonsils were slightly hypertrophied. The chest was normal, there was a faint systolic murmur at the apex of the heart. The rate and rhythm of the pulse were normal. The pelvic measurements were adequate. Wassermann, urine, vaginal and urethral smears were negative. The blood pressure varied from 100/60 to 118/60. She gained approximately twenty pounds in weight during her pregnancy. About three weeks before confinement the patient had an attack of acute bronchitis which had cleared up by the time she was admitted to the hospital. Her labor lasted thirty-eight hours, during which time she had three rests with morphine, $\frac{1}{4}$ of a grain each, at intervals of about eight hours. The last dose of morphine was given about six hours before delivery. The cervix was completely dilated about eight hours before the patient was delivered. A persistent left occipitoposterior position was diagnosed. The membranes were intact. It was deemed advisable to deliver this patient in view of the fact that she had been in labor thirty-eight hours

was increased over that of the children of 1888. These studies also demonstrate that a tendency of the mothers to menstruate early or late is repeated to some extent in the offspring, and are thus in keeping with the contention that the age of attainment of puberty is an *hereditary* character (Crew¹⁶).

The effect of *constitution* on the early or late appearance of the menses has also been considered. Bolk¹³ found that blondes, as determined by the color of skin and hair, had an average age of onset of puberty of almost one year less than did brunettes. A similar finding was recorded by Schaeffer,¹¹ although he noted a much less significant difference between the two groups.

Since it might be conjectured that childhood marriage with its consequent early stimulation of the genital organs could lead to an earlier appearance of the menses, it is impressive that no such relation could be established by Curjel¹⁷ among Indian women.

The age of onset of puberty is thus a very variable characteristic. An analysis of the factors which may influence it, climate, race, environment, social status, heredity, as well as personal elements such as diet and hygiene, renders the problem exceedingly complicated. However, it is desirable that further light be sought since the early or late appearance of menstruation undoubtedly represents a constitutional trait of considerable significance.

THE MENARCHE, BODY GROWTH, AND SECONDARY SEXUAL CHARACTERS

The life of an individual may be divided into three chief phases: first, a period of growth which includes intrauterine development and the changes occurring in the body from birth to adulthood; second, a period of maturity; and third, a period of retrogression, or senescence. The transition either from the first to the second, or from the second to the third of these stages is associated with a series of changes which occupy a number of years and vitally affect the individual concerned. In women, the inception of menstruation at the age of puberty, or the cessation of the menses at the climacteric, not only provide important landmarks which are readily observed, but each has always been accepted as the actual climax of the first and second periods of life, respectively. The work of recent years, however, has cast doubt on the correctness of this interpretation (Biedl,¹⁸ Steinach and Kammerer,¹⁹ Crew,¹⁶ Hartman²⁰), and in any consideration of puberty it is important to recognize the relation of the appearance of the first menses to certain other manifestations of this transition period.

It has long been known that a close connection exists between somatic and sexual development, and it is well illustrated by the sudden increase in the rate of body growth, the "Zweite Streckung" of Stratz, which occurs as adolescence approaches. This period, the "age of

with evidence of beginning reinflation. April 1, x-ray showed a complete reinflation of the collapsed lung.

Sputum examination showed many pus cells and a few streptococci. Blood count revealed four million red cells and a normal leucocyte count. The urine was negative. This patient was discharged from the hospital April 7, 1932, apparently well. The massive collapse of the lung was the only complication in her postpartum period and she is at the present time in good health.

The temperature curve, with no elevation over 101.8° and that at the time of delivery, showed conclusively that there was no pneumonic infection present.

REFERENCES

- (1) *Pasteur, W.*: Internat. J. Med. Sc., p. 242, 1890. (2) *Briscoe, J. E.*: Quart. J. Med. 13: 293, 1920. (3) *Jackson, Chevalier, and Lee, Walter E.*: Ann. Surg. 82: 364, 1925. (4) *Sante, E. R.*: Radiology 8: 13, 1927. (5) *Potter, R. P.*: Radiology 17: Aug., 1931. (6) *Bradford*: Oxford Loose Leaf Medicine 2: 127, 1920.

PREGNANCY IN SPORADIC CRETINISM

ROBERT J. PATTON, M.D., ANN ARBOR, MICH.

(From the Department of Obstetrics and Gynecology, University Hospital, University of Michigan)

PREGNANCY in the sporadic cretin is rare if judged by the paucity of reported cases found in a fairly extensive review of the indexed literature.

B. A., aged twenty, was admitted to the University Hospital Jan. 20, 1933, on the Medical Service. She had been born of normal parents and reared in Saginaw, Michigan, with ten normal siblings. Past history revealed physical and mental retardation, tinnitus, diminished auditory acuity, marked sensitivity to cold, hypokinesia, dysmenorrhea, and menorrhagia. The menses had been irregular since onset at the age of fourteen. Typical cretinoid characteristics were found on physical and roentgenologic examinations. The patient was 135 cm. (53½ inches) in height and had a basal metabolic rate of minus 25 per cent. Diagnoses of sporadic cretinism and bilateral nerve deafness were made.

Desiccated thyroid gland was administered daily. The patient left the hospital after two months but returned for monthly examinations over a period of a year and was subsequently seen by her local physician. Thyroid medication, over this period, varied from 0.032 gm. to 0.8 gm. (½ to 12 gr.) daily. Antuitrin was administered by her local physician during May and June, 1934 (1 ampule daily for two weeks, and on alternate days for two weeks). The basal metabolic rate vacillated with the amount of thyroid therapy reaching a high of plus 9 on one occasion and falling to minus 26 per cent after a period of discontinuance of the drug. Symptomatic improvement, including relief from deafness, was noted when the rate approached normal.

This patient was readmitted Jan. 11, 1935, to the obstetric service. She had added two inches to her height in two years. Libido had evidently been stimulated, there having been no heterosexual interest or intercourse prior to 1934. Her last menstrual period began July 25, 1934. No desiccated thyroid was taken after the following October. She was judged to be six or seven months pregnant. The fetal skeleton was normal by roentgenography.

During the last trimester the basal metabolic rate rose from minus 9, eight weeks before delivery, to plus 7 per cent in the final week (Fig. 1). Blood cholesterol content was 370 mg. per cent (Fig. 1). The intelligence quotient was 63. Pheno-

practically ceases within one to three years (Table I). In keeping with the previous observations, the earlier the onset of puberty the more rapid is the completion of growth processes, and hence individuals who begin to menstruate while very young tend toward a short stature as adults.

TABLE I. PERCENTAGE OF SCHOOLGIRLS WHO CEASE GROWING AT A GIVEN AGE. (BOAS)

AGE AT FIRST MENSTRUATION	NO. OF CASES	AGE AT WHICH GROWTH CEASES			
		14	15	16	17 and later
10-11	13	50	50	--	--
11-12	49	--	27	56	17
12-13	103	6	40	27	27
13-14	181	10	3	38	49
14-15	104	--	5	40	55
15-16	45	--	--	15	85

The relation of the appearance of the extragenital secondary sexual characters to the onset of menstruation has been studied in large groups by Ploss and Bartels,²¹ Stratz,²² Weissenberg,¹² Godin,²³ Demmé,²⁴ Rosenstern,²⁵ and others, and more recently Priesel and Wagner²⁶ have reported their findings in individual cases followed over a number of years.

Although the development of these characteristics overlaps and they progress simultaneously until maturity has been reached, a definite order is discernible in their first appearance. Until the age of seven or eight the growth of male and female children remains essentially similar, but subsequently sexual differentiation begins. This manifests itself as early as eight to ten years of age in the development of the female pelvis, which now assumes wider proportions and is accompanied by a deposition of fat over the hips, and later, over the shoulders, thorax, and pubis.

The differentiation of the female breasts, consisting of an elaboration of the duct system, deposition of fatty tissue and development of the areola and nipples, may begin as early as the tenth or the eleventh year. In a group of children studied by Demmé,²⁴ evidence of beginning breast development was found in 2 per cent of children at ten years of age, in 18 per cent at eleven, in 43 per cent at twelve, and in 75 per cent at thirteen years of age. Priesel and Wagner²⁶ assert that full development is attained in from three to four years and is invariably far advanced at the time of the first menses. However, Dieckmann²⁷ has also observed that histologic differentiation is not complete until about the twentieth year.

The growth of hair over the symphysis pubis generally sets in after the breast changes have made their appearance, and it is also present

metabolic rate and cholesterol occurs in pregnancy,⁶ but whether this is due to factors endogenous to the mother's own body or to factors supplemented by the fetus cannot definitely be stated.

Desiccated thyroid gland and antuitrin medication previous to conception suggest the alleged thyroid-pituitary relation to sexual function.⁷

The present report of another case of pregnancy in sporadic cretinism and delivery of an apparently normal infant is added to the literature.

REFERENCES

- (1) *Gordon, M. B., and Cohn, D. J.*: Am. J. Dis. Child. 35: 192, 1928.
- (2) *Poncher, H. G., Visscher, M. B., and Woodward, H.*: J. A. M. A. 102: 1132, 1934.
- (3) *Bronstein, I. P.*: J. A. M. A. 100: 1661, 1933.
- (4) *Halsted, W. S.*: Johns Hopkins Hosp. Rep. 1: 373, 1896.
- (5) *Alexander, D. A.*: Bristol Med. Chir. J. 27: 128, 1909.
- (6) *Tyler, M., and Underhill, F. P.*: J. Biol. Chem. 66: 1, 1925.
- (7) *Marine, D.*: J. A. M. A. 104: 2250, 1935.

A NORMAL HUMAN OVUM IN A STAGE PRECEDING THE PRIMITIVE STREAK*

E. A. EDWARDS, M.D., H. O. JONES, M.D., AND JOHN I. BREWER, M.D.,
CHICAGO, ILL.

(From the Gynecological Service and the Henry Baird Favill Laboratory of St. Luke's Hospital and the Department of Anatomy of the University of Chicago)

THIS embryo was found in a uterus removed because of fibromyomas. There was also a dermoid cyst of the right ovary. The blastocyst, embedded in the endometrium of the posterior wall, was fixed with the surrounding decidua and adjacent myometrium in formol-Zenker's solution within nine minutes after the uterine blood vessels were clamped. The entire blastocyst was cut serially.

The patient, aged thirty-eight, had had three normal full-term deliveries, the last in June, 1934. Her menstrual periods began at thirteen years of age, occurred regularly every twenty-eight days, the flow lasting four to five days. The last menstrual period began Feb. 15, 1935 and ended Feb. 19, 1935. The period expected on March 15, 1935 failed to appear. The abdominal supracervical hysterectomy was done on March 20, 1935, thirty-three days after the last menstrual period. An accurate coital history could not be obtained.

The age of this embryo is estimated to be about fifteen days and is slightly younger than the Peter's ovum.

The measurements made on the slides and on the model at 250 diameters are as follows:

External chorion (including full extent of the trophoblast)	3 × 3.0 × 1.9 mm.
Internal chorion	2.13 × 1.71 × 1.01 mm.
Amnion	0.224 × 0.186 × 0.167 mm.
Yolk sac	0.197 × 0.160 × 0.120 mm.
Embryonic disc	0.184 × 0.188 mm.
Greatest length of mesodermal villus	0.27 mm.

*Aided by a grant from the Rockefeller Foundation to the University of Chicago.

Note: A detailed description of this ovum will be published later.

Read at a meeting of the Chicago Gynecological Society, October 18, 1935.

at this time. There are distinct morphologic changes in the ovaries, a significant increase in the weights of the thyroid and adrenal glands, and the involution of the thymus begins. On the other hand, the anterior lobe of the hypophysis, which apparently plays a most important rôle, shows no definite modification of its size or histologic appearance.

On the basis of numerous experimental studies and clinical observations, there is no doubt that the changes associated with puberty are directly attributable to the action of the anterior hypophysis, the thyroid, and the gonads, while the thymus exerts an influence which is not yet fully understood. The operation of hypophysectomy in young experimental animals is followed by a cessation of body growth and an atrophy of the genital organs, and the administration of anterior pituitary extracts or of fresh gland tissue results in excessive skeletal growth and increased development of the sex glands. The removal of the thyroid in immature animals may markedly interfere with body growth and the development of the gonads, but since the same phenomenon also occurs when a hyperthyroid condition is produced, its rôle may simply consist of acting as a controlling influence. The ovaries are directly concerned with the development of the accessory genital organs and the secondary sexual characters. And finally, the recent experiments of Rowntree et al.,³² who induced precocious maturation by the injection of thymus gland extract in successive generations of rats, demonstrate that this organ has some important function associated with puberty.

On the other hand, the exact rôle of the endocrines and the complexity of their interaction which leads to somatic and sexual maturity are still far from solution. Until such information is available there is a serious handicap to the proper understanding of the disorders of this period, but it must be remembered that we are dealing with processes which affect the whole body, and attention cannot be directed solely to the pelvic organs.

CHARACTER OF EARLY MENSTRUAL PERIODS

Although it has long been held that the normal menstrual cycle is twenty-eight days in length and any variation from this standard must be considered as pathologic, recent years have seen a radical departure from this standpoint. It is now clearly recognized that in the majority of women there is a great variability in the lengths of successive cycles, and that this is consonant with normalcy (Fluhmann³³). For this reason it is not surprising to find this irregularity more marked during the years of puberty (Paton,³⁴ Knaus,³⁵ Engle and Shelesnyak,⁹ and others), and that it generally manifests itself by a lengthening of the cycles so that in many instances months may intervene between successive periods.

ideas about availability of tissues before operating procedures are carried out. We always try to arrange it so that one of us will be about when another one is operating. Thus the tissue removed is fixed. Ideally it would be better if microscopic observations were made as soon as the tissue is removed.

DR. BREWER (closing).—Dr. Greenhill said that probably there are less than 75 ova under twenty days of age reported in the literature. There are really less than 50. We determined the ages of our ova from our own statistics since we have accurate coital history in two of the five cases.

DR. GEORGE W. BARTELMEZ.—It is a great compliment to this Society to have in it a group of men so vitally interested in embryology. Studies of this kind will throw light on fundamental biologic problems such as the variability in the time of ovulation and the viability of the egg.

SPONTANEOUS DELIVERY COMPLICATED BY RECTAL STRICTURE, RECTOVAGINAL FISTULA AND RUPTURE OF THE RECTUM

FRED. A. KASSEBOHM, M.D., AND MILTON J. SCHREIBER, M.D.,
NEW YORK, N. Y.

(From the Obstetrical Service of The Harlem Hospital)

RUPTURE of the rectum during delivery has not been recorded in the literature. Rectal stricture and rectovaginal fistula complicating pregnancy and labor are uncommon but have been noted frequently. In the obstetrical service of The Harlem Hospital, rectal stricture as a complication of labor was found once in 1,500 cases. The occurrence of two catastrophic events served to focus attention upon a relatively rare condition and to cause the preparation of this report. In a period of several months, two deaths occurred on the service in cases complicated by rectal stricture and rectovaginal fistula. One of these was an operative delivery. The second case was terminated spontaneously after a short, rapid labor. Consent for necropsy was obtained in this second case and the clinical and relevant necropsy findings are here recorded.

Mrs. H. P., aged thirty-two years, colored, housewife, was admitted to the obstetrical service at 9:30 P.M., on June 24, 1934. She had been cared for during the prenatal period by the out-patient service. The entire prenatal record was negative with the exception of a flat rachitic pelvis. The Wassermann was negative.

She had had two previous pregnancies. The first had terminated in a spontaneous, premature labor in 1926. The puerperium was uneventful and she left the hospital seven days postpartum at her own risk. In July of 1929, she was admitted in active labor which terminated in spontaneous delivery. In the course of this second hospital stay the Wassermann was found to be 4-plus and the presence of a rectal stricture was noted.

With the termination of the puerperium she was referred to the out-patient department for antisyphilitic therapy and treatment for the rectal stricture. This was continued for one year and at the end of that time the Wassermann was negative.

In June of 1930, hospitalization for treatment of the rectal stricture was advised and refused.

approaching this problem. For instance, a young woman of nineteen under treatment for prolonged uterine bleeding gave a very definite history of two "types" of menstrual periods. The more frequent type, suggesting a normal cycle, was characterized by a flow lasting four to five days, moderate in amount, and accompanied by severe cramps. The second variety, which may represent cyclic bleeding due to hyperplasia endometrii, occurred at varying intervals, either alternating with the first or following several such cycles, lasted considerably longer, was much more profuse in amount, and was *not* associated with cramplike pain.

The treatment of uterine hemorrhages at the time of puberty, in the absence of organic lesions, should consist of general measures as mentioned previously, but in addition certain procedures must be followed to control the bleeding. It may be necessary to perform a curettage and even repeat it at intervals, but in most instances the bleeding can be controlled by the daily injection of large doses of chorionic gonadotropic hormone ("anterior pituitary-like" factor). The administration of thyroid extract may prove of value (Lisser³⁹). In our experience it is very seldom necessary to resort to radical procedures such as hysterectomy or irradiation.

SUMMARY

The period of *puberty* represents a transition from the period of growth to complete somatic and sexual maturity. The *menarche*, or the appearance of the first menstruation, is a single event in the course of puberty. It does not denote either the end point or the beginning of the pubescent period. It bears a definite relationship to body growth, but the development of the secondary sexual characters begins before and continues after the first menses. The menstrual cycles during the first few years are characterized by marked irregularities, are frequently separated by long periods of amenorrhea, and are functionally incomplete, since a comparative sterility probably exists. With the exception of abnormal uterine hemorrhage, the treatment of functional menstrual disorders during this time should consist primarily of general hygienic measures rather than of attempts to directly influence the pelvic organs.

REFERENCES

- (1) Kennedy, W. J.: J. Obst. & Gynec. Brit. Emp. 40: 792, 1933. (2) Engelmann, G. J.: New York M. J. 75: 221, 1902. (3) Baldwin, B. T.: The Physical Growth of Children From Birth to Maturity, University of Iowa, 1921. (4) Lintz, W., and Markow, H.: Endocrinology 7: 57, 1923. (5) Hotelling, Mrs. Floy: Personal communication, 1931. (6) Popenoe, P.: Eugenical News 13: 101, 1928. (7) Gould, H. N., and Gould, M. R.: J. A. M. A. 98: 1349, 1932. (8) Boas, F.: Human Biol. 4: 307, 1932; 5: 429, 1933. (9) Engle, E. T., and Shelesnyak, M. C.: Human Biol. 6: 431, 1934. (10) Mills, C. A.: Am. J. Hyg. 15: 593, 1932. (11) Schaeffer, R.: Arch. f. Gynäk. 84: 657, 1908. (12) Weissenberg, S.: Das Wachstum des Menschen, Stricker & Schroeder, Stuttgart, 1911. (13) Boll, L.: Ztschr. f.

rectal induration in the region of the constricted area extended for a distance of 2 to 3 cm. Just proximal to the stricture there was an opening in the rectum 1.5 to 2 cm. in diameter.

Pathologic Diagnosis: (1) Generalized peritonitis, (2) rectal stricture, (3) recto-vaginal fistula, (4) rupture of the rectum, and (5) static ulceration of the rectum.

The rectal wall proximal to a stricture does not long retain its integrity. The constant damming of feces with the subsequent pressure upon the rectum leads to static ulceration. Areas of such ulceration will not stand undue stress. In the case herein described, the pressure exerted by the fetus as it passed through the birth canal was sufficient to cause rupture of the rectum.

Some months previous to the occurrence of this accident a similar case was admitted to the service. Rectovaginal fistula, and rectal stricture were present. Approximately fourteen hours following an instrumental delivery, the patient died. With the knowledge obtained from the above necropsy findings, one might readily deduce the occurrence of the same events in the case mentioned.

Rectal stricture and consequent static ulceration of the rectum present a grave obstetric problem. Cesarean section, sparing the birth canal and its neighboring organs the stress of labor, may be the key to its solution.

272 W. 90 STREET
1055 MORRIS AVENUE

SEPTATE VAGINA COMPLICATING LABOR

G. NORMAN ADAMSON, M.D., CHICAGO, ILL.

(From the Prenatal Clinics of the Chicago Board of Health and the Division of Obstetrics, Provident Hospital)

CONGENITAL malformations of the female reproductive apparatus are usually of sufficient rarity in themselves to command attention, but more so when such anomalies are complicated by a full-term pregnancy. These have an incidence of less than 2 per cent of gynecologic pathology, according to Miller, the most common being the bicornuate uterus with a single cervix (Levison). In this connection one is reminded of a most interesting case of a viable fetus presented by Green and Miller, as an instance of a double vagina, cervix, and uterus. The present report is of a pregnancy complicated by a deformity of the vagina only, which, considering the embryology, is somewhat singular.

Mrs. W. M. A., aged twenty-seven, negro, gravida i, para 0; first came under my observation March 7, 1935, for prenatal care in one of the maternity clinics of the Chicago Health Department.

In a routine vaginal examination the anomaly, presently to be described, was first noted.

Menses began at eleven years, and were normal. Last period Nov. 18, 1934.

This was her first pregnancy, notwithstanding the fact that she had been married eight years and did not use contraceptives.

Her past personal and family history were unimportant. Laboratory tests of blood and urine remained negative and blood pressure within normal limits.

Physical examination revealed an apparently robust looking female of moderate muscular development, 119 pounds in weight and 5 feet 1 inch in height. With exception of the usual changes found in an eighteen weeks' pregnancy, nothing of an abnormal nature was observed until the vagina was examined.

hours after delivery. Moreover, such conditions as pyelitis, mastitis, respiratory infection, etc., were clinically excluded as the sole cause of the fever, although in certain instances they were present as a complicating factor; and in each case positive clinical or bacteriologic evidence of the intrauterine infection was adduced. As a contrast to this series we selected at random 500 case histories of patients delivered during the same time period but whose puerperia were normal in every way. Again, instances of cesarean section were excluded from the group. These two groups of cases were taken from the general clinic material, which is divided about equally between the white and black races and which contains less than 10 per cent private patients. It is felt that so far as predisposing factors such as race, social status, etc., are concerned, the two series of cases are strictly comparable.

It is our purpose first to compare the two groups of cases in respect to certain facts of the clinical history and course of labor, making necessary subdivisions for each separate analysis. Finally, we will present a special analysis of the abnormal group in terms of certain signs and symptoms coincident to the infection.

COMPARISON BETWEEN THE GROUPS OF INFECTED AND NONINFECTED CASES

1. *Make-up of the Series According to the Duration of Pregnancy and Type of Delivery.*—Table I presents the make-up of the two series of cases according to the duration of pregnancy and type of delivery. It will be noted that less than 5 per cent of the deliveries in either group

TABLE I

TYPE OF DELIVERY	PER CENT OF TOTAL CASES	
	P. I.*	NORMAL
F. T. S.*	65.69	77.67
F. T. O.	29.54	17.75
Pr. S.	3.30	3.05
Pr. O.	1.47	1.53

*In this and the succeeding tables the following abbreviations will be used: F. T. S., Full-term spontaneous; F. T. O., full-term operative; Pr. S., premature spontaneous; Pr. O., premature operative; P.I., puerperal infection.

were premature according to the classification employed at this Clinic, which postulates that a premature child is at least 1,500 gm. in weight or 35 cm. in length and not over 2,500 gm. in weight or 45 cm. in length. The difference between the two series is entirely due to a much higher operative incidence among those patients developing puerperal infection.

2. *Color of Patient.*—The increased incidence of puerperal infection among black women as contrasted with white has already frequently been pointed out, the figures shown in Table II serving to emphasize this point. It should be noted that with spontaneous delivery at term, although slightly less than half of the patients in the normal group were colored, yet seven-tenths of those developing signs of infection were of that race.

was considered advisable to remove the vaginal septum under nitrous oxide anesthesia. The thickened, frontal portion was clamped with dressing forceps, excised and ligated with No. 2 forty-day chromic catgut. This was repeated at the caudal attachment, where considerable hemorrhage was encountered. Because of the danger of further aggravating this condition, the patient was allowed to recover from the effects of the anesthetic before the delivery was accelerated by oxytocic drugs. The first stage required sixty-three hours.

The second stage progressed slowly because of the acuteness of the pubic angle and because the parietals were arrested at the ischial spines. Under general anesthesia a deep left lateral episiotomy was done and the fetus extracted with low forceps.

The third stage presented nothing unusual.

The baby was female, weighing 3,250 gm. and required alpha-lobelin injection and oxygen stimulation for resuscitation. There was no appreciable injury from use of forceps and aside from an incidental hemorrhage from the cord, both baby and mother had an uneventful recovery.

COMMENT

A case is presented of a genital anomaly in a moderately contracted flat pelvis complicating a full-term pregnancy and resulting in dystocia. It is a point of interest whether or not the accidental use of the left vaginal compartment, in which the cervix presented contributed materially to the sterility during the eight previous years of married life. The operative correction of this deformity would have been advisable before labor.

309 EAST FORTY-SEVENTH STREET

FIBROMYOMA OF THE CERVIX UTERI; THREE CASES, ONE DEVELOPING IN THE CERVICAL STUMP AFTER HYSTERECTOMY

J. P. GREENHILL, M.D., CHICAGO, ILL.

IN THE July, 1935, issue of THE AMERICAN JOURNAL OF OBSTETRICS AND GYNECOLOGY, Counsellor and Collins review the literature on fibromyomas of the cervix uteri. They emphasize the infrequency of cervical fibroids, especially large ones, and report a case of their own. I should like briefly to report three cases, one of which developed in the cervical stump after supracervical hysterectomy. I demonstrated the first specimen before the Chicago Gynecological Society on Nov. 15, 1929.

CASE 1.—This was described in a report made at a meeting of the Chicago Gynecological Society and published in a previous issue of the JOURNAL (19: 860, 1930). The illustration of the specimen (Fig. 1) was not included at that time.

CASE 2.—Mrs. M. W. (No. 1316770), aged forty-three, was admitted to the Cook County Hospital on Oct. 13, 1932, complaining of a large swelling of the abdomen which she had noticed for about a year. Her general health had been good until the preceding year. The past history was negative except that the patient had had a supracervical hysterectomy in 1915 since which time no menstrual bleeding occurred. The general examination was negative except for a mild hypertension and moderate obesity. Abdominal examination revealed the presence of a symmetrically enlarged hard mass which extended upward almost to the xiphoid. There was a long, wide midline scar. On bimanual examination the cervix was found to be very

the childbearing population as a whole, and in accordance with this, 55 per cent of the total normal group were pregnant for the first time. In the series of women with puerperal infection the incidence of primiparas was considerably higher and totalled 72.66 per cent, a discrepancy which is partially explained by the increased number of operative deliveries in this class of patients. However, it seems clear that this factor is not the only one since, when only those patients delivered spontaneously are considered, the percentage of primiparas is still much higher in the infected than in the normal group, and is 71.51 and 54.29, respectively.

5. *Time of Admission to Hospital.*—It seemed reasonable to assume that the further labor progressed before the patient was admitted to the hospital the greater might become the chance of an ensuing puerperal infection, and it was in an effort to investigate this premise that the analysis shown in Table V was made. The duration of labor at the time of admission was arbitrarily catalogued as early or late, with one-half of complete cervical dilatation being chosen as the dividing point. A

TABLE V. PER CENT OF TOTAL CASES

	F. T. S.		F. T. O.		TOTAL INCLUDING PR.	
	P. I.	NORMAL	P. I.	NORMAL	P. I.	NORMAL
Before onset of labor	19.35	14.82	31.33	27.95	23.60	17.62
Early, cervix 0-4 cm.	62.17	58.27	49.33	62.38	57.06	58.06
Late, cervix 5-9 cm.	18.47	26.91	19.33	9.67	19.34	24.32

study of Table V would not seem to confirm the assumption made at the beginning of this paragraph, although certain modifying factors are to be found. In the first place, those patients admitted prior to the onset of labor comprise an abnormal group, since their admission was usually necessitated by premature rupture of the membranes, postmaturity, or some obstetric complication. It is our intention to deal with the effects of the time of rupture of the membranes in succeeding paragraphs. However, obstetric abnormalities or postmaturity necessitating admission prior to the onset of labor causes a high incidence of operative induction of labor so that the effect of this is shown by the increased percentage of patients of this type in the group with puerperal infection as contrasted with the normal one. It will be noted that this disparity exists in both the spontaneous and operative groups. It should be stated for purposes of clarity that induction by bag or bougie classifies the delivery as operative, while if the only manipulation is induction by artificial puncture of the membranes, the delivery is still classified as spontaneous. Referring again to Table V it will be seen that of the total cases analyzed similar numbers were admitted early in labor in both groups, whereas when the admission occurred late, more patients were found in the normal than in the infected series. However, if the groups

by 6 by 4½ inches). The patient had a febrile convalescence and an infected abdominal wound. However, she left the hospital in excellent condition thirty-three days after the operation.

CASE 3.—Mrs. S. G. (No. 1533201), aged thirty-four, was admitted to the Cook County Hospital on Oct. 5, 1935, complaining of a feeling of heaviness in the lower abdomen, a vaginal discharge, backache, and frequency of urination. The patient had had one full-term pregnancy and four miscarriages, and her menstrual history was not unusual. The past and surgical histories were negative and the general physical examination presented no abnormalities. Abdominal examination revealed a large, hard, movable mass approximately 15 cm. (6 inches) in diameter. Vaginal examination showed a marital outlet without any relaxation, and a smooth, firm but short cervix. The corpus of the uterus seemed to merge with the mass felt abdominally. The adnexa could not be felt. The diagnosis made was "fibroid uterus." An operation was performed on October 8, and it was found that the large mass was a fibroid of the cervix with the body of the uterus resting above it as in the first case. The fibroid and the corpus of the uterus were removed in one piece. The patient made an uneventful recovery and left the hospital ten days after operation.

55 EAST WASHINGTON STREET

INTERSTITIAL PREGNANCY

FRANK C. SPENCER, M.D., HONOLULU, HAWAII

MRS. K. M., a Japanese female, aged thirty-three, was first seen March 19, 1933. She complained chiefly of irregular menstruation and dysmenorrhea. A laparotomy had been done thirteen years before, appendectomy being apparently the only thing done at that time. She had one child twelve years old, and there had been no pregnancies since. Pelvic examination revealed a large cyst of the left ovary about the size of a baseball. General examination was negative. The Wassermann and Kahn reactions were negative.

Laparotomy was done at the Queen's Hospital March 24, 1933. Massive hydrops of the left tube coalescing with a large cystic left ovary was found. The right tube and ovary were grossly normal. A left salpingo-oophorectomy was done, and the patient made an uneventful recovery.

On March 19, 1935, the patient came into the office, complaining of nausea. Her last menstrual period was in January, and she had been regular previous to that time. Pelvic examination revealed a uterus two months pregnant. Irregular enlargement, especially on the right side, was noted.

On April 13 pelvic examination was repeated, at which time it was noted that there was unusual enlargement of the right cornu. She was still quite nauseated; urine examination was negative; weight was 101 pounds. The patient had no complaints except nausea. One cubic centimeter of eschatin (adrenal cortex hormone) was given hypodermically for the nausea.

On April 22 she again reported, stating that she had been free from nausea for three days after her last visit but it had returned. At that time she complained of slight pain in the right lower quadrant, and the uterus was irregular in outline, extending higher in the abdomen on the right side. The eschatin was repeated for the nausea. She was seen again April 26, 27, and 28; the nausea had improved.

dence of cases found is twice as high in the puerperal infection group as in the normal one; and, moreover, the mean time interval between rupture and delivery is much longer in the former than in the latter group, being seven hours two minutes and five hours twenty-two minutes, respectively.

TABLE VII. PER CENT OF TOTAL CASES

HOURS	F. T. S.		F. T. O.		TOTAL INCLUDING PR.	
	P. I.	NORMAL	P. I.	NORMAL	P. I.	NORMAL
0- 2	66.57	70.47	47.61	57.95	61.09	67.92
3- 5	10.33	12.18	7.48	10.23	9.88	11.49
6-11	9.42	9.58	12.24	13.64	9.88	10.48
12-17	6.08	3.63	12.93	10.23	8.06	4.88
18-23	3.04	1.55	3.40	2.27	3.02	1.81
24 and over	4.56	2.59	16.33	5.68	8.06	3.42

8. *Cervical Dilatation at Time of Rupture of Membranes.*—The analysis of the rôle which early rupture of the membranes plays in the production of subsequent infection is concluded with Table VIII which

TABLE VIII. PER CENT OF TOTAL CASES

	F. T. S.		F. T. O.		TOTAL INCLUDING PR.	
	P. I.	NORMAL	P. I.	NORMAL	P. I.	NORMAL
Before labor	27.37	15.84	31.82	19.10	28.67	17.14
0-4 cm.	6.93	14.02	12.12	14.60	8.53	13.91
5-9 cm.	9.85	16.88	18.18	29.21	12.09	18.75
Fully dilated	55.84	53.26	37.88	37.09	50.71	50.20

indicates the effect of this factor in terms of cervical dilatation at the time of its occurrence. The main point of interest in this table lies in the incidence percentages noted when rupture occurred prior to the onset of pains with much higher figures obtaining in the infection groups throughout than in the normal ones. One may conclude that early rupture of the membranes, no matter at what stage of labor or before it, has little effect on the development of an ensuing puerperal infection providing delivery is consummated within twelve hours. It is not within the province of this report to discuss the debatable effect of premature rupture on the prolongation of labor, although this factor is, of course, important to the outcome of the individual case.

9. *Vaginal Examinations.*—It is a matter of Clinic policy that routine examination of the patient during labor be made per rectum and that vaginal touch be employed only when rectal findings are sufficiently unsatisfactory to warrant it. However, it is stipulated that with the exception of simple perineal forceps, a vaginal examination be done before any operative procedure is undertaken. Table IX is included to show the percentage of total patients in the series of whom vaginal examination (in most instances only one) was done, and it will be seen that with both spontaneous and operative delivery the incidence is almost

COMPLETE TORSION OF TUBE AND OVARY COMPLICATING PREGNANCY

DEAN SHELTON, M.D., SANDUSKY, OHIO

COMPLETE torsion of the tube and ovary complicating pregnancy is a relatively rare condition and is very difficult to diagnose. Careful search of gynecologic and obstetric publications, as well as current textbooks, provides very little information on the subject. Corporeal movements and peristalsis are given by most authors as probable causes of torsion of the tube and ovary as seen in the nonpregnant state. When accompanying pregnancy it has been suggested that an abnormally large corpus luteum may precipitate the condition.

The symptoms are generally acute abdominal pain, tenderness and rigidity, occasionally accompanied by vomiting and elevation of temperature. A well-marked chemical peritonitis may follow the extravasation of blood into the peritoneal cavity. The severity of the symptoms is generally dependent upon the degree of torsion and amount of interference with the blood supply of the affected organs. Depending upon the location of the tumor, vesical and rectal symptoms may be well marked.

The pathologic changes are due almost entirely to a sudden interference with blood supply. This circulatory disturbance first manifests itself by a hyperemia, later by edema, and finally by gangrene with an entire obliteration of structure.

Mrs. H. L., twenty-nine years of age, para ii, was first seen in consultation on the afternoon of Dec. 12, 1934. Three days before, the patient had developed sudden excruciating pain in the right lower quadrant. The pain was only partially relieved by large doses of morphine. The patient at that time thought that she was about six weeks pregnant. The following morning blood tinged urine was passed, and a diagnosis of urethral calculus was made by the family physician. The pain had subsided in part in the afternoon that the patient was seen in consultation. There was no temperature elevation but a slight increase in the pulse rate. There was no vaginal bleeding.

Upon examination the abdomen was slightly distended throughout, with marked tenderness and muscle spasm over the right lower quadrant. Pelvic examination revealed a large tender mass in the culdesac. The cervix was displaced anteriorly, but because of the marked tenderness the body of the uterus could not be definitely outlined. In spite of a rather atypical history, a diagnosis of ruptured tubal pregnancy was made.

An exploratory laparotomy was performed. When the peritoneum was incised, a large amount of blood tinged fluid escaped. The right tube and ovary had undergone complete torsion and were gangrenous. The uterus was enlarged to the size of a six to eight weeks' pregnancy. There was no evidence of a corpus luteum of pregnancy in the uninvolved ovary. The right tube and ovary were removed and the abdomen closed without drainage. On the third postoperative day the patient aborted, otherwise the convalescence was uneventful.

Pathologic Diagnosis.—The specimen consisted of two fragments of what appeared to be blood clot. Diffusely hemorrhagic and no structural details could be identified.

Microscopic Examination.—The outlines of many greatly dilated vessels can be made out, but other than these shadowy outlines diffuse hemorrhage and necrosis prevent recognition either of the nature of the tissue or the process by which it was destroyed.

Diagnosis.—Hemorrhagic necrosis of unidentifiable tissue.

TABLE XI A. PRIMIPARAS. PER CENT OF TOTAL CASES

DURATION IN HOURS	F. T. S.		F. T. O.		TOTAL EXCLUDING PR.	
	P. I.	NORMAL	P. I.	NORMAL	P. I.	NORMAL
0- 2	5.91	4.83	0.00	5.17	3.94	4.90
3-29	85.03	87.92	73.23	79.31	81.10	86.04
30 and over	9.06	7.24	26.77	15.52	14.96	9.06
Mean duration	15 h. 24 m.	13 h. 59 m.	22 h. 48 m.	18 h. 12 m.	17 h. 52 m.	14 h. 55 m.

TABLE XI B. MULTIPARAS. PER CENT OF TOTAL CASES

DURATION IN HOURS	F. T. S.		F. T. O.		TOTAL EXCLUDING PR.	
	P. I.	NORMAL	P. I.	NORMAL	P. I.	NORMAL
0- 2	23.00	18.30	6.45	3.33	19.08	15.85
3-29	71.00	75.16	70.97	93.34	70.99	78.14
30 and over	6.00	6.54	22.58	3.33	9.92	6.01
Mean duration	11 h. 17 m.	10 h. 20 m.	11 h. 12 m.	11 h. 0 m.	13 h. 38 m.	10 h. 27 m.

illustrates clearly the increased incidence of prolonged labor and the greater mean duration of labor in patients subsequently developing infection as contrasted with those normal throughout the puerperium.

12. *Duration of Second Stage of Labor.*—It will be seen from Table XII that among both primiparas and multiparas the second stage of

TABLE XII A. PRIMIPARAS. PER CENT OF TOTAL CASES

DURATION IN MINUTES	F. T. S.		F. T. O.		TOTAL EXCLUDING PR.	
	P. I.	NORMAL	P. I.	NORMAL	P. I.	NORMAL
0- 59	69.29	73.56	42.61	41.38	60.68	66.54
60-119	27.80	22.60	32.17	44.83	29.21	27.44
120 and over	2.90	3.84	25.22	13.79	10.12	6.01
Mean duration	53 min.	48 min.	84 min.	74 min.	63 min.	54 min.

TABLE XII B. MULTIPARAS. PER CENT OF TOTAL CASES

DURATION IN MINUTES	F. T. S.		F. T. O.		TOTAL EXCLUDING PR.	
	P. I.	NORMAL	P. I.	NORMAL	P. I.	NORMAL
0- 59	93.18	88.23	61.91	73.33	87.16	85.79
60-119	6.82	9.80	23.81	16.67	10.09	10.93
120 and over	0.00	1.96	14.28	10.00	2.75	3.27
Mean duration	28 min.	29 min.	65 min.	45 min.	35 min.	31 min.

labor was found to be somewhat, but not significantly, prolonged in the infection groups as contrasted with the normal ones. The observed differences were very small in the series of spontaneous deliveries and rather more definite in the operative groups, although here the operative procedures themselves rather than the observed ten-minute difference in the mean duration of the second stage probably form the basis of the subsequent infections.

13. *Duration of Third Stage of Labor.*—Table XIII indicates that no difference was observed between the infected and normal groups with relation to the duration of the third stage of labor, and hence we feel

chest position with her hands on her knees or thighs. If there were any doubt about the meaning of this effigy it would be immediately dispelled on looking at Fig. 3 in which the effigy has been tipped backward and the large protruding vulva exposed.

The third effigy of this series was not photographed; it was broken during an argument between two "dealers" over its price. This effigy depicted the end of second-stage labor. It was an exact reproduction of the earthen pot in Fig. 2, except that the infant's head had been delivered and the infant was being held in its mother's own hands. Mr. Drake, head of the Art Studio of the Mayo Clinic, has beautifully portrayed the likeness of this third effigy for us, and it is shown in Fig. 4.

The erect-kneeling posture (Fig. 2) with the knees somewhat separated and the hands resting on the thighs, is precisely the same as that assumed by the Mongolians, and probably also by the Yumas, when in labor. It can quite likely be said that the mythical Mound Builders, be they predecessors of our Indians or tribes of the same stock, were delivered of or delivered their young in the same position as many of the red squaws were known to have done in Colonial times. We cannot take the testimony of these vessels, the indelible records of an extinct people, as indicating the exact positions assumed during labor; they were effigies which depicted ideals.

PRIMARY TUBERCULOSIS OF THE VAGINA*

JOSEPH L. MCGOLDRICK, A.M., M.D., F.A.C.S., BROOKLYN, N. Y.

(From the Obstetrical and Gynecological Service of the Kings County Hospital)

MRS. C. C. (Hospital No. 14171), aged thirty-nine, colored, married, born in United States. Admitted to Kings County Hospital April 23, 1935, complaining of (1) dyspareunia, (2) vaginal discharge, and (3) moderate menorrhagia; all for the period of the past five years.

Tuberculosis in her family was denied; no contact with tuberculous persons. Husband living and well and denied tuberculosis in his family. Patient otherwise in excellent health.

Menstruation started at fourteen years of age; duration four days, interval twenty-eight days; always regular and not painful; menorrhagia started about five years before admission; last period March 30, 1935. Since marriage, a cleansing douche was employed after each period.

Obstetric history: Gravida xi, para ii, antepartum, intrapartum and postpartum periods were normal; both children are living and well; the youngest is nineteen years of age; contraceptives have never been employed.

Surgical history: No operations.

Physical examination in general negative.

Pelvic examination showed a multiparous outlet, perineum in good condition; no inflammation of the meatus or gland ducts. The vaginal mucosa had three strips (1.5-2.0 cm. in width) of granulomatous ulceration involving both lateral and posterior walls and extending from the fornices to the hymenal caruncles; surface covered with mucopurulent material, easily removed; edges smooth; inflammatory zone about the edges; bled readily on palpation and was sensitive to touch. Cervix pointed in the vaginal axis; freely movable; motion not painful; small bilateral

*Presented at a meeting of the Brooklyn Gynecological Society, October 4, 1935.

is interesting to note that no significant difference was observed in the two series following third degree tears. However, with cervical lacerations the results were quite different and the incidence of such tears of sufficient degree to warrant repair was three times as great in those cases with puerperal infection as in the normal group.

16. *Postpartum Hemorrhage*.—That excess bleeding following delivery decreases the resistance of the patient and renders her more susceptible to subsequent infection is shown in Table XVI. The mean blood

TABLE XVI. PER CENT OF TOTAL CASES

BLEEDING	F. T. S.		F. T. O.		TOTAL INCLUDING PR.	
	P. I.	NORMAL	P. I.	NORMAL	P. I.	NORMAL
0-199 c.c.	46.63	58.02	18.30	24.73	39.33	52.68
200-399 c.c.	32.58	28.89	37.91	40.86	33.33	30.65
400-599 c.c.	11.52	7.90	30.07	34.41	16.67	12.45
600-999 c.c.	5.62	3.46	11.11	0.00	7.49	2.87
1000 c.c. and over	3.65	1.73	2.63	0.00	3.18	1.34
Mean blood loss	286 c.c.	229 c.c.	409 c.c.	317 c.c.	319 c.c.	243 c.c.

loss is consistently and significantly higher in the puerperal infection group as contrasted with the normal one. Moreover, the incidence of postpartum hemorrhage (600 c.c. or more) is two and one-half times as great in the abnormal as in the normal series. Although patients operatively delivered tend to bleed more than those with spontaneous termination of labor, yet the operative factor itself cannot be used to explain the above difference, since when only spontaneously delivered cases are considered the incidence of abnormal blood loss is almost twice as high in the infected group as in the normal one.

17. *Intrapartum Infection*.—The diagnosis of intrapartum infection was made whenever during labor and prior to delivery the mouth temperature rose to 100.4° F. or above and other causes for the febrile manifestation were ruled out. Table XVII indicates a frequency of

TABLE XVII. PER CENT OF TOTAL CASES

TEMPERATURE	F. T. S.		F. T. O.		TOTAL INCLUDING PR.	
	P. I.	NORMAL	P. I.	NORMAL	P. I.	NORMAL
100.4° F. or above	5.30	1.23	18.01	6.45	9.36	2.48

intrapartum infection between three and four times as great in the series of patients developing puerperal infection as compared with those who did not become infected.

18. *Intercurrent Disease*.—The analysis shown in Table XVIII was undertaken in an effort to determine to what extent intercurrent disease might play a rôle in increasing the probability of subsequent puerperal infection. From a comparison of the two series of infected and normal patients, it would seem that toxemia and cardiac disease had no effect.

FATAL CASE OF YEAST MENINGITIS IN PREGNANCY*

HARRIS J. TIMMERMAN, M.D., CHICAGO, ILL.

(From the Chicago Maternity Center)

MRS. C., aged thirty-four, gravida x, para v, received prenatal care at the Chicago Maternity Center from May 15, 1935, to June, 1935. Her last menstrual period was Oct. 1, 1934. She was classified as a Class I cardiac, with mitral stenosis. The Wassermann was negative.

This woman was first seen in her home on June 27, 1935, at which time she was eight and one-half months pregnant and not in labor. The patient gave a history of an acute upper respiratory infection of two weeks' duration with headache, nausea and vomiting, and dizziness. Normal temperature, pulse, and blood pressure. The only treatment instituted was supportive. On July 1, 1935, she lapsed into an intermittent coma. The headache and vomiting became severe. The findings at that time were marked dehydration, irrationality, exaggerated reflexes, slight neck rigidity and a positive Kernig's sign. Temperature 99.4°; pulse 84; blood pressure 94/44. The urine showed albumin 0, sugar 0 and diacetic acid ++. Obstetric findings were: Near term pregnancy, O.L.T, fetal heart 140, patient not in labor. She was sent to the Michael Reese Hospital with a diagnosis of a probable tuberculous meningitis and dehydration acidosis.

At the hospital the patient became worse rapidly, all of the meningeal signs increasing, and she died July 6, 1935. A postmortem cesarean section was performed, but the 6¼ pound baby died two hours later.

The pathologic diagnosis after autopsy was of a chronic leptomeningitis produced by *Torula histolytica*, with terminal bronchopneumonia. An acute verrucous endocarditis of the mitral valve was superimposed on an old, healed endocarditis. Ascending pyelonephritis with multiple abscesses of both kidneys was also present.

Grossly the arachnoid of the brain was studded with whitish nodules measuring up to 3 mm. in diameter. Microscopic section of these nodules showed a marked infiltration of lymphocytes and in addition many large round or oval cells 16 to 20 micra in diameter. These cells had an eosinophilic cytoplasm with a highly refractile cellular membrane and from one to six nuclei approximating the size of a lymphocyte.

Yeast organisms were recovered from the lungs, but from no other organs. No similar organisms were found in the fetus.

*Read before the Chicago Gynecological Society, October 18, 1935.

febrile phase of only two days, and half of the total three days, while only an eighth have a duration of a week or more. This indicates that in the vast majority of cases the infection is mild and does not progress

TABLE XX. PER CENT OF TOTAL CASES

DAYS	F. T. S.	F. T. O.	TOTAL INCLUDING PR.
2	28.21	19.25	25.14
3	26.54	21.74	24.95
4	14.25	15.53	14.86
5	10.34	11.80	11.19
6-7	10.34	11.18	10.46
8-15	7.55	16.15	10.09
16-30	2.24	4.35	2.94
31 and over	0.56	0.00	0.37
Mean number days	4.39	5.43	4.73

past the stage of endometritis. Those cases following operative delivery tend to have a longer duration than when labor terminates spontaneously, with the mean duration for the entire series being 4.73 days.

3. *Height of Fever.*—Table XXI is included in order to demonstrate the general degree of severity of the cases in the series in terms of amount of fever, the highest temperature reading being taken as the

TABLE XXI

FEVER	F. T. S.	F. T. O.	TOTAL INCLUDING PR.
100.4-100.9	15.08	14.29	14.50
101 -102.9	60.34	58.39	60.37
103 -104.9	22.35	23.60	22.20
105 and over	2.23	3.72	2.93
Mean elevation	102.1	102.3	102.2

index. It will be noted that in only one-fourth of the total patients did the fever reach 103° F. while in less than 3 per cent of them was the high reading of 105° F. attained.

In passing, it may be said that mathematical correlations were done in an effort to determine what relation, if any, existed between the above three factors which have been discussed. It was found that no correlation existed between the time of onset of fever and its severity as judged by the highest temperature reached. There was a slight but not significant relation between the time of onset of fever and its duration. A marked and significant correlation was adduced between the height of fever and its duration. From these figures one may imply that the time of onset of fever in the puerperium gives no indication as to the clinical severity which the individual case may attain, although naturally the degree of febrile reaction is sharply significant.

4. *Organisms Found in Intrauterine Culture.*—After two febrile days an intrauterine culture was obtained by means of the "Little" tube on 60 per cent of the patients in the series, and in this way the bacterial

must be given, and by the appropriate route, for the individual case. In this respect neither pernicious nor hypochromic anemia in pregnancy differs from similar types of anemia in the nonpregnant.

The nature of the deficiency state resulting in addisonian pernicious anemia has been somewhat elucidated. A substance, to be found in liver, kidney, brain, placenta, and perhaps other organs, is necessary for normal hematopoiesis in man. This substance is apparently elaborated through the interaction of an enzyme-like factor found in normal human gastric juice and a substance present in the average human dietary. It has been shown that the gastric factor is not any of the common ferments of gastric juice. The dietary factor is frequently associated with foods rich in the vitamin B complex, although not to be identified with any of the known purified components of this vitamin. Evidence has further been produced which suggests that disturbances of intestinal absorption may result in a virtual deficiency of the product of interaction of the gastric and food factors.

Studies of pernicious anemia of pregnancy by Strauss have shown that the condition may result from a temporary suppression of secretion of Castle's gastric factor, from a lack of the dietary factor or from a combination of these two. Although defective absorption has not been demonstrated to be etiologically related to pernicious anemia of pregnancy, it seems probable that this does play a rôle in some cases.

Simple hypochromic anemia in nonpregnant individuals has been shown to be associated with a deficiency of available iron. This deficiency may result from an inadequate intake of iron, from impaired absorption or from loss from the body. The high incidence of gastric anacidity in patients with hypochromic anemia has suggested that this or some associated gastrointestinal defect results in malabsorption of iron. Pregnant women with hypochromic anemia have been shown to have a high incidence of gastric anacidity; many have partaken, not only during pregnancy, but frequently over a period of years, of diets low in iron content. Further, attention has been directed to the obvious fact that all the blood-forming materials which enter into the fetal organism are derived from the mother. This is comparable, as far as the maternal body economy is concerned, to chronic blood loss.

Pernicious anemia is relatively rare in pregnancy in the temperate zone. When it occurs it may be controlled by liver therapy, preferably administered parenterally. Its prevention in many instances is to be achieved by the administration of a diet rich in foods containing the vitamin B complex such as meat and other proteins.

Moderate degrees of hypochromic anemia are common in pregnancy. There is reason to believe that an adequate dietary for the pregnant woman will eliminate many of these cases. However, proper food is frequently costly and dietary habits of a lifetime are altered with difficulty. Hence, it should be of great interest to all concerned with maternal wel-

group. If one considers the hemolytic streptococcus cases as the most typical group of direct contact infections (by the physician or nurse) the figures adduced agree fairly well with the racial admixture observed in the normal series (53.60 and 46.40 per cent white and black, respectively). The incidence of infections due to the anaerobic streptococcus according to the type of delivery approximates much more closely the make-up of the normal than of the infected series. No significant alterations according to type of organism were noted with the parity of the patients. There were seven deaths in the group of 545 cases of infection, a mortality rate of 1.28 per cent, and, as was to be expected, most of these (4) occurred in the hemolytic streptococcus group. One of these deaths was due to pulmonary embolism but the remainder were definitely caused by the infectious process (septicemia 3, peritonitis 2, and thrombophlebitis 1).

As a final analysis, it was deemed of interest to ascertain the number of instances of infection in the series which were unaccompanied by any external predisposing factor. These were cases with spontaneous delivery, and without vaginal examinations, perineal or cervical lacerations, premature rupture of membranes, prolonged labor or postpartum hemorrhage. It was found that one-fourth of the cases in the series fell into such a group, 30.29 per cent of the total blacks and 18.05 per cent of the total whites, respectively. In two-thirds of this group the anaerobic streptococcus was the infecting organism. The causes of the intrauterine process in these 140 patients must remain a matter of conjecture. Undoubtedly, in a number of these and particularly in the colored race, the patient herself was at fault through self-manipulation during labor, while in others intercourse just prior to the onset of labor might well be blamed. Probably some were gonococcal in origin while others represent a blood-borne infection from some disease focus elsewhere in the body. It seems reasonable to suppose that many represent infection attained by organisms from the nasal spray of the patient or of some attendant at labor or delivery. One can merely surmise as to the possibility of these cases of clinical puerperal infection being instances of autogenous infection, since recent studies have cast considerable doubt upon the possibility of this happening. It is, however, of interest that one-fourth of the total cases analyzed comprise a group that in the light of our present knowledge must be classed as unpreventable. Most of this group, fortunately, were clinically mild in character, and there were no deaths occurring among them.

SUMMARY AND CONCLUSIONS

A detailed analysis and comparison has been made of two series of patients delivered at or near term on the Obstetrical Service of the Johns Hopkins Hospital, divided according to whether the puerperium was normal or febrile due to puerperal infection. Instances of cesarean

Society Transactions

OBSTETRICAL SOCIETY OF PHILADELPHIA

MEETING OF OCTOBER 3, 1935

The following papers and discussion were presented:

The Incidence and Treatment of Secondary Anemia in Out-Patient Maternity Cases. Dr. O. J. Toland. (For original article, see page 640.)

Observations on the Use of Collip's Emmenin in the Menopause. Dr. Catharine Macfarlane. (For original article, see page 663.)

CHICAGO GYNECOLOGICAL SOCIETY

MEETING OF OCTOBER 18, 1935

The following cases with discussions were presented:

Fatal Case of Yeast Meningitis in Pregnancy. Dr. H. J. Timerman. (For original article, see page 686.)

On Thyroid Rests. Dr. Otto Kampmcier.

A Normal Human Ovum in a Stage Preceding the Primitive Streak. Drs. E. A. Edwards, H. O. Jones and John I. Brewer. (For original article see page 672.)

BROOKLYN GYNECOLOGICAL SOCIETY

MEETING OF OCTOBER 4, 1935

The following case reports and papers were presented:

Primary Tuberculosis of the Vagina. Dr. J. L. McGoldrick. (For original article, see page 684.)

Adenocarcinoma of Supernumerary Breasts of the Labia Majora in a Case of Epidermoid Carcinoma of the Vulva. Dr. H. J. Greene. (For original article see page 660.)

Interstitial Radiation of the Cervix with a Suggested Modification of Tausig's Operation. Dr. C. Duncan. (For original article, see page 623.)

WASHINGTON GYNECOLOGICAL SOCIETY

MEETING OF OCTOBER 26, 1935

The following papers were presented:

An Analysis of 569 Forceps Operations. Dr. H. F. Kane and Dr. H. P. Parker. (For original article, see page 657.)

A New Breast Supporter for the Puerperium. Dr. B. Notes.

12. The mean number of days between delivery and the onset of infection in terms of a rise in temperature to 100.4° F. or above was three, and in 84 per cent of the cases the onset was during the first four days.

13. The average duration of fever was 4.73 days and was longer in those patients with operative than in those with spontaneous delivery. In 86 per cent of the patients the febrile manifestation had disappeared within seven days.

14. The mean highest temperature noted during the infective process was 102.2° F. and in less than a quarter of the total group did the fever attain a reading of 103.0° F.

15. Intrauterine cultures were done in over 60 per cent of the patients in the group and some variety of streptococcus was obtained in over three-fourths of them, although the incidence of *S. hemolyticus* was only 6 per cent. A higher percentage of anaerobic streptococcus was found in spontaneous than in operative deliveries, while reverse proportions occurred for the aerobic nonhemolytic streptococcus. The colon bacillus was found twice as often following operative as after spontaneous deliveries.

16. For the total series of cases of puerperal infection 38.4 per cent were in white and 61.6 per cent were in black patients. In contrast to this, 60 per cent of the infections due to the hemolytic streptococcus were in white women, whereas only one-third and one-fourth of the groups due to the aerobic nonhemolytic and anaerobic streptococcus, respectively, were in this race. The division of the cases due to the anaerobic streptococcus, according to whether delivery was spontaneous or operative, tends to approximate closely a similar division of the group with normal puerperium; while the hemolytic and aerobic nonhemolytic varieties approach more closely the infected group. The total maternal mortality was 1.28 per cent and the majority of deaths were due to the hemolytic streptococcus.

17. In more than one-fourth of the total cases of the series the labor and delivery had been normal and without any intravaginal manipulation. This large group of cases were all spontaneously delivered, the membranes had not ruptured spontaneously, labor was not prolonged, there were no vaginal examinations, no laceration occurred to perineum or cervix, and bleeding after delivery was not excessive. Many of these patients were probably self-infected, by digital manipulation during labor, by intercourse shortly before or during the early hours of labor, or through the blood stream from a focus of infection elsewhere in the body. Some were probably gonococcal in origin. Others were undoubtedly due to streptococci from the nasal spray of some attendant at delivery or the patient herself. One cannot definitely state that any of these cases were instances of autogenous infection but it seems significant that of a large group of patients with puerperal infection more than a quarter must be classed as unpreventable in view of present obstetric knowledge.

many of which were those of relatively infertile elderly primiparas. One hundred and thirty-seven cases gave evidence of fetal distress. Prolonged labor was the rule. Over one-third of the patients had abnormal pelvises and 11.5 per cent were of the troublesome "dystocia dystrophy syndrome" category. Many patients were constitutionally below par, inertia was common, dozens started in labor unsatisfactorily and yet did not present definite indications for cesarean section at the outset. In evaluating the merits of this record one must never lose sight of the fact that the majority of these cases could, without exaggeration, be classified as the most difficult and trying of the series of 40,000. As further evidence of this fact a large number of patients presented several complications any one of which would cause concern to an experienced obstetrician.

During the year (Oct. 1, 1932, to Oct. 1, 1933) the incidence of Dührssen's incisions dropped to 1 per cent, or 28, in 2,808 deliveries, due, perhaps, to better treatment of the prolonged first stage and possibly to extension of the use of cesarean section.

In general, an indication arises when danger is present or imminent to mother or child unless delivery is rapidly effected.

Maternal indications include:

1. Severe exhaustion in spite of treatment when, after a prolonged labor, progress has been arrested for several hours. Cervical dystocia may arise if a tough, resistant cervix be present. There may be faulty pains which cannot produce proper dilatation. "Transverse arrest" may complicate the mechanism of labor.

2. Serious preeclampsia or eclampsia in the face of slow progress and unsatisfactory medical treatment is occasionally an indication.

3. Cardiac decompensation during labor is an excellent indication if the patient can be delivered by Dührssen's incisions and a not too difficult forceps operation.

4. A true Bandl's ring with or without uterine tetany may bring labor to a standstill and threaten the baby or mother or both. If relaxation cannot be obtained by anesthesia, a trial of adrenalin, etc., cervical incisions may be indicated. This was the sole indication in eight and was combined with others in twenty-six cases.

5. Any sudden exigency such as abruptio placentae with sudden concealed or external bleeding when labor is well advanced. Live babies were secured in three cases of abruptio placentae.

Fetal indications include prolapsed cord, marked and progressive irregularity of the fetal heart sounds or the passage of meconium in cephalic presentations.

Contraindications.—Placenta previa is an absolute contraindication for Dührssen's incisions. This condition was the sole indication in two patients with serious hemorrhage. It was also a secondary indication three times. One should always endeavor to keep the friable and extremely vascular lower uterine segment intact. Incisions into this field wherein extensions by tearing may involve the enormous uterine sinuses is a folly that may invite a dangerous or even fatal hemorrhage.

HOSPITALS, ADDRESSES	CHIEF OF SERVICE	APPLY TO	APPOINT- MENTS MADE	NO. OF PTS.	NO. OF BEDS		LENGTH SERVICE	SERVICE BEGINS	NO. OF OB. AND G. APPTS.	SAL- ARY PER MO.	MAIN- TE- NANCE	PRE- VIOUS IN- TERNE- SHIP	AP- POINT- MENT ONLY BY PROMO- TION ?	COMMENT
Hillman Hospi- tal, Birming- ham, Ala.	Obstetrics	Director	Internes	Ob. 2087	Ob. 50	Internes	1 yr.	July 1	3	None	Yes	No		Rotating serv- ice incl. 6 wk. Gyn., 3 wk. Ob.
	Dr. F. A. Lupton	of the	Dec. 1;	Gyn. 825	Gyn. 38	Resi- dents	1 yr.	July 1	2	\$ 30	Yes	1 yr.	Pro- ferred	Rotating serv- ice incl. 6 mo. ca. Ob. and Gyn.
	Dr. J. G. Vance	Hospital	May 1											
	Gynecology													
Los Angeles County Hos- pital, Los Angeles, Calif.	Dr. S. G. Stub- bins													
	Dr. M. Y. Dab- ney													
	Obstetrics	Medical	Jan. and	Ob. 6465	Ob. 220	Internes	1 yr.	Varies		None	Yes	No		Rotating serv- ice incl. 6 wk. ca. Ob. and Gyn.
	Dr. L. G. Mc- Nello*	Director	July	Gyn. 1611	Gyn. 72									
White Memori- al Hospital, Los Angeles, Calif.	Dr. Wilburn Smith													
	Obstetrics													
	Gynecology													
White Memori- al Hospital, Los Angeles, Calif.	Dr. R. J. Thompson	Medical	July 1	Ob. 1152	Ob. 22	Internes	1 yr.	July 1	6	\$ 10- \$ 75	Yes	1 yr.	By Civil Service Exam.	First 18 mo. Ob., last 18 mo. Gyn.
		Supt.		Gyn. 1000	Gyn. 45	Residents	3 yr.	July 1	10g	\$ 40	No	No		Rotating serv- ice incl. 10 wk. Ob., 5 wk. Gyn.
													No	Rotating betw. Ob. and Gyn. the 3 yr.
Children's Hos- pital, San Francisco, Calif.	Dr. H. A. Stephenson*	Medical	Before Mar. 1	Ob. 645	Ob. 44	Internes	1 yr.	July 1	8	None	Yes			Rotating serv- ice incl. 24 wk. Ob., 12 wk. Gyn.
		Director			Gyn. No record									
						Asst. Res.	1 yr.	Aug. 1	8	\$ 25	Yes	Yes	No	

should enter into the procedure with at least as much forethought as with cesarean section or other major obstetric operations.

A prolonged first stage of labor without progress for more than eight hours in spite of previous supportive therapy probably demands treatment by incisions when the contractions have been moderately severe and the cervix is in proper condition. After a thorough study of this large series of cases we cannot but coincide with Dr. F. L. Adair's¹⁸ views on the indications and conditions for the operation, namely:

Dührssen's incisions are permissible only in those cases where prompt termination of labor is necessary, either in the interest of the fetus, the mother, or both. The cervix must be adequately effaced, though it is improperly dilated, and conditions must be such that the subsequent operation for delivery would be indicated and could be properly performed if the cervix were already fully effaced and dilated.

It is an operation for specially trained practitioners, to be carried out only in a suitable environment as a well-equipped maternity hospital.

TECHNIC

As most patients are primiparas, and adequate exposure is essential, a deep mediolateral episiotomy is made. Because of the depth of the episiotomy and the long labor, hemorrhage from the episiotomy may be profuse. It must be quickly and effectively controlled, by a gauze pack against which pressure is exerted by the vaginal retractor.

Control of blood loss from the perineal and cervical incisions is of the highest importance, because postpartum hemorrhage and infection are more prone to occur in these patients in whom the labor is prolonged and the operative manipulation excessive. It may be feasible to tie two or three of the larger bleeders in the episiotomy wound, but valuable time and blood should not be lost in being too exacting in this as the pack should prove sufficiently effective.

With adequate exposure the cervix may be clamped posteriorly and pulled down gently for this incision. The posterior incision is made first because, if done after the anterior ones, the bleeding from them tends to obscure the field. Long-handled clamps and scissors facilitate the operation. Neither should have sharp points. It may be necessary to pull down gently on the clamps to expose more adequately the cervix before finally placing them, but one should remember that the cervix may be friable (especially if edematous) and a tear may be dangerous. Under sight and palpation the incisions are made between the clamps *to the fornix* (Fig. 1). In many cases clamps are entirely unnecessary. If, as rarely happens, one cannot cut entirely to the fornix with the certainty of not injuring the bladder, rectum, or peritoneal cavity, cut only as far as is safe on palpation and sight. Deliberate delivery is rewarded by less likelihood of extension of the incisions.

After delivery of the child and placenta, the retractors are replaced and the edges of the cervix are grasped with sponge forceps for inspection and for repair. If the patient is in shock or bleeding too profusely for repair, the lower uterine segment and vagina can be packed tightly to control the hemorrhage, and the cervical wounds left for later repair. Similarly, if there is evidence of frank genital infection such as chills and high fever or purulent discharge, repair is strongly contraindicated.

HOSPITALS, ADDRESSES	CHIEF OF SERVICE	APPLY TO	APPOINT- MENTS MADE	NO. OF PTS.	NO. OF BEDS	LENGTH SERVICE BEGINS	NO. OF OB. AND G. APPTS.	SAL- ARY PER MO.	MAIN- TE- NANCE	PRE- VIOUS IN- TERNE- SHIP	AP- POINT- MENT ONLY BY PROMO- TION ?	COMMENT
Columbia Hos- pital for Women, Washington, D. C.	Obstetrics Dr. Prentiss Willson*	Supt. of Hospital	2 resi- dents April or May; 2 more Oct. or Nov.	Ob. 1746	Ob. 69	Residents 1 yr.	Jan. 1 and July 1: 6 mo	None	Yes	Yes		Straight Ob./ Gyn. service.
	Dr. W. M. Sprigg											
	Dr. J. J. Mun- dell*											
	Dr. Richard Silverster											
	Gynecology Dr. E. W. Titus*			Gyn. 1351	Gyn. 56							
Gallinger Mu- nicipal Hos- pital, Wash- ington, D. C.	Dr. G. B. Miller	Supt. of Hospital	Jan. 1	Ob. 1721	Ob. 106	Internes 1 yr.	July 1	\$ 15	Yes			Rotating serv- ice incl. 4 wk. ca. Ob. and Gyn.
	Dr. J. F. Crow- ley*			Gyn. 1236	Gyn. 80							
	Dr. T. J. Kelly					Residents 1 yr. mini- mum	July 1	\$ 50	Yes	Yes	Yes	
Grady Hospi- tal, Atlanta, Ga.	Dr. J. R. Mc- Cord*	Dr. McCord	Jan. 1	Ob. 3711	Ob. 92	Internes 2 yr.	July 1	\$ 15	Yes	No	Compet- itive	Rotating on Ob./Gyn.
				Gyn. 1147	Gyn. 55	Asst. Res. 1 yr.	July 1	\$ 25	Yes	Yes	Compet- itive	Rotating on Ob./Gyn.
						Residents 1 yr.	July 1	\$ 50	Yes	Yes	Yes	

REVIEW OF CASES

Age.—The age varied from seventeen to forty-four with an average of 26.7 years which is above the average age in this clinic, especially as the vast majority were primiparas.

Bodily Build.—The height and weight (an attempt to evaluate stature) showed no deviation from the normal for women of this age.

Parity.—Obviously one would expect cervical dystocia from rigidity to be an affliction of primiparas, and this series bears this out, 88.7 per cent being primiparas. Fetal indications predominated in the multiparous cases.

Duration of Pregnancy.—A study of the duration of pregnancy in weeks gives some evidence of the increased incidence of postmaturity in these cases. Roughly, one-fourth of the cases were premature, slightly over one-third at term, and one-third postmature. The weights of the babies tend to substantiate the postmaturity of these pregnancies.

Pelvis.—Pelvic dystocia was present in many cases and may have been a factor in the prevalent cervical dystocia by not permitting the head properly to fit the cervix from failure of proper engagement. The frequency of occiput posterior positions may be, in fact, accounted for by this incidence of contracted pelvis. And yet in 377 cases or 63.8 per cent the pelvis was classified as normal or just-major from careful prenatal measurements often checked again during labor or at delivery.

Sixty-eight cases, or 11.5 per cent, were of the dystocia, dystrophy syndrome, or achondroplasia group. They include the short, stocky, masculine type of woman so adequately described by Horner and DeLee.¹⁰

Induction.—Of 536 recorded cases, 105 were induced, 88 mechanically, and 17 medically, a ratio of 1 to 5, far above the usual incidence of induction. One would be led to believe that the long-drawn-out labor commonly seen from the forced induction with an "unripe" cervix may be one factor in producing cervical dystocia.

While *uterine inertia* played a rôle in these cases of dystocia, it cannot be compared with cervical dystocia and exhaustion as an etiologic factor. Weak pains were observed in less than one-fourth of the cases.

Comments on the state of the cervix, aside from degree of effacement and dilatation, were rare, yet in 83 there was a marked edema and in 30 a remarkable rigidity was noted. The variance of cervical dilatation is worthy of note and yet 80 per cent of the cases attained a dilatation of 7 cm. or more.

Length of Labor.—Obviously labor was prolonged except where sudden fetal or maternal indications arose with conditions favorable for delivery from below. It would have been foolhardy to have allowed these women to labor for days in the face of no progress after twelve to eighteen hours. In fact, as experience was gained in observing this type of prolonged labor, a more radical attitude was often taken by performing the incisions after a shorter period of failure to progress. As a result, many cases were better risks than after a low grade fever with tachycardia had developed with signs of exhaustion. In the opinion of many of the operators the incidence of infection and general morbidity was also thus reduced.

The average duration for the entire series was 33.6 hours: for 64 multiparas, 18.9 hours; for 525 primiparas, 35.4 hours, considerably over the average figures given in the standard textbooks. Sixty-one per cent of the patients labored over twenty-five hours and 20.3 per cent over fifty hours.

The incidence of prolonged labor (over twenty-four hours) at the Chicago Lying-In Hospital in the past year (Oct. 1, 1932, to Oct. 1, 1933) was 264 cases in 2,808, or 9.4 per cent, as compared with 61.1 per cent in this series. *Therefore it is noted that prolonged labors are increased sixfold over normal incidence in these cases.*

HOSPITALS, ADDRESSES	CHIEF OF SERVICE	APPLY TO	APPOINT- MENTS MADE	NO. OF PTS.	NO. OF BEDS		LENGTH SERVICE SERVICE BEGINS	NO. OF OB. AND G. APPTS.	SAL- ARY PER MO.	MAIN- TE- NANCE INTER- SHIP	PRE- VIOUS IN- SHIP	AP- POINT- MENT ONLY BY PROMO- TION ?	COMMENT
Illinois Research and Educational Hospital, Chicago, Ill.	Dr. F. H. Falls*	Dr. Falls	Early in April	Ob. 750 plus OPD Gyn. 370	Ob. 27 Gyn. 13	Internes	18 mo.	July 1	3	None	Yes	No	Rotating; 6 or 15 wk. Ob.; 5 6 wk. Gyn.
						Asst. Res.	1 yr.	July 1	1	\$41.66	Yes	Yes	O.P. service 8 mo.; hospi- tal service 4 mo.
						Residents	1 yr.	July 1	1	\$83.33	Yes	Yes	Same as Asst. Res.
St. Luke's Hos- pital, Chicago, Ill.	Dr. H. O. Jones*	Office of the Di- rector	Jan.	Ob. 948 Gyn. 694	Ob. 44 Gyn. Varies	Internes	1 yr.	Jan., Apr. and July 1	23g	None	Yes	No	Rotating serv- ice incl. 6 wk. ea. Gyn. and Ob.
						Residents	1 yr.	July 1	2	None	Yes	Yes	6 mo. Ob., 6 mo. Gyn.
						Internes	1 yr.	July 1	5	\$12.50	Yes	No	Monthly rota- tion
Coleman (Indi- ana U.) Hos- pital, Indian- apolis, Ind.	Obstetrics Dr. H. F. Beck- man* Gynecology Dr. F. C. Walker*	Adminis- trator of Hosp.	Jan.	Ob. 1153 Gyn. 811	Ob. 24 Gyn. 24	Residents	1 yr.	July 1	Ob. 1 Gyn. 1	\$33.33	Yes	Yes	Gyn. resident sends 6 mo. Gyn., 6 mo. Surgery
						Senior Internes	1 yr.	July 1	3	\$ 20	Yes	Yes	Rotating serv- ice
						Asst. Res.	1 yr.	July 1	1	\$140	Yes	Yes	Appointment made by University
University Hos- pitals, Iowa City, Ia.	Dr. E. D. Plass*	Supt. of Hosp., or Chief of Staff	Feb. 1	Ob. 1398 Gyn. 1214	Ob. 75 Gyn. 50	Residents	1 yr.	July 1	1		Yes	Yes	Usually

UNIVERSITY OF WASHINGTON
SCHOOL OF NURSING
HARBORVIEW DIVISION.

HUNT AND MCGEE: DÜHRSEN'S INCISIONS

605

and the number of incisions with the results that there were almost exactly the same number of accidents of this sort whether two or three incisions were made. If only one incision was made there was a slightly greater chance for extension by tears. However, when only one incision was made the dilatation was nearly complete. Perhaps the more serious extensions and lacerations might have been eliminated with three incisions. If the cervical dilatation is far from complete three incisions are much safer.

Delivery.—Incision was invariably followed by delivery. Forceps were applied as a rule although 66 versions were performed. Forceps delivery failed in 21 instances, delivery being effected by version or craniotomy, depending on fetal viability at the time the forceps failed. The disastrous effects of high and the more difficult midforceps on the fetus is mentioned below and accounts for about one-half of the rather high fetal mortality. Rotation of the fetal head in the cases recorded could be accomplished manually in 204 instances while forceps rotation was required 106 times.

Weight of Babies.—While the average length (49.9 cm.) and weight (3,330 grams) of the babies is only slightly, if any, over the average, the number of babies over the average weight is relatively high. Only 143 babies weighed less than 3,000 gm. while 405 were over that figure and 218 weighed over 3,500 gm. The higher percentage of heavier babies linked with the number of overterm pregnancies establishes oversize as a real cause of the type of dystocia under consideration. The harder postmature fetal heads are notoriously deficient in their ability to mold readily into the pelvis and fit against the cervix firmly.

Postpartum Hemorrhage and Pathologic Third Stage.—A study of the blood loss and difficulties of the third stage of labor reveals much of interest in these cases. The fear of hemorrhage following this radical procedure voiced by both the older and present-day obstetricians is well founded.

The blood loss was estimated in 570 cases. Of these 161, or 28.3 per cent, lost over 500 c.c. which figure is arbitrarily taken to mean a postpartum hemorrhage. The average for all cases was 398 c.c. These are only estimates; if accurate measurements had been taken, the average would probably have been greater.

A separate analysis of the first and last 100 cases gives some striking information relative to blood loss. The average blood loss for the first 100 patients was 539 c.c. with 50 patients losing 500 c.c. or more. Thus, exactly one-half of the first 100 patients had a postpartum hemorrhage according to our standard. In the last 100 patients the average blood loss was only 310 c.c., an average reduction per patient of 229 c.c. Only 14 per cent lost 500 c.c. or over.

Several factors account for this improvement. Perhaps the most important one was the realization that controlled and even radical management of hemorrhage, if required, was a conservative course to follow, after one has embarked on such a radical procedure in patients who are not in ideal condition after a long exhaustive labor. A glance at the morbidity table below will show that postpartum hemorrhage was more frequently correlated with a febrile puerperium than was any other factor including even the various types of intrauterine manipulation.

Recent use of intravenous pituitrin in the early stage of hemorrhage from uterine atony may have helped avoid more serious hemorrhages. A more alert regard for small but steady blood loss from a bleeding episiotomy wound or cervical wounds has saved much valuable blood. The insidious "drip" from the edge of the towel under the patient's buttocks may accumulate into a serious hemorrhage in the course of a long operative delivery. Any bleeding wound should be compressed where possible. This may save 200 to 300 c.c. of blood in a long delivery and help overcome later morbidity.

Intravenous infusions of glucose or saline solution on occasion, hypodermoclysis and blood transfusions, while seldom needed might have been employed more fre-

HOSPITALS, ADDRESSES	CHIEF OF SERVICE	APPLY TO	APPOINT- MENTS MADE	NO. OF PTS.	NO. OF BEDS		LENGTH SERVICE	SERVICE BEGINS	NO. OF OB. AND G. APPTS.	MAIN- TE- NANCE	PRE- VIOUS IN- TERNE- SHIP	AP- POINT- MENT ONLY BY PROMO- TION ?	COMMENT
St. Joseph's Hospital, Baltimore, Md.	Obstetrics Dr. W. W. Gray Gynecology Dr. Leo Brady Dr. T. K. Gal- vin	Secy. of Executive Com.	Dec.	Ob. Gyn.	Ob. Gyn.	Internes	1 yr.	July 1	None	Yes			Rotating serv- ice
						Asst. Res.	1 yr.	July 1	1	Yes	Yes	Usually	Straight Ob.- Gyn. service
						Residents	1 yr.	July 1	1			Usually	Straight Ob.- Gyn. service
Mt. Sinai Hospital, Baltimore, Md.	Obstetrics Dr. M. W. Aaronson Gynecology Dr. Alfred Ull- man	Supt.	Early in Jan.	Ob. 759	Ob. 33	Internes	1 yr.	July 1	None	Yes	Pre- ferred		Gyn. combined with Surgery
				Gyn. 335	Gyn. 5	Second Year Internes	1 yr.	July 1	None	Yes	Pre- ferred		
						Residents	1 yr.	July 1	Ob. 1 \$47.50 2	Yes		Yes	
University of Maryland Hospital, Baltimore Md.	Dr. L. H. Doug- lass Supt. of Hosp. or Prof. of Obst.		Jan.	Ob. 1200	Ob. 68	Internes	1 yr.	July 1	None	Yes	No		Rotating serv- ice incl. 8 wk. ea. Ob. and Gyn.
				Gyn. 400	Gyn. 20								
						Asst. Res.	1 yr.	July 1	2	Yes	Yes	No	
West Baltimore General Hos- pital, Balti- more, Md.	Dr. A. C. Tiev- meyer			Ob. 325	Ob. 24	Residents	1 yr.	July 1	1	Yes	Yes	No	Ob. and Gyn. residencies discontinued
				Gyn. 800	Gyn. 40				\$ 35	Yes		No	

TABLE IV. MORBIDITY

	DE LEE STANDARD		BRITISH		STRASSBURG	
	COMBINED	ALONE	COMBINED	ALONE	COMBINED	ALONE
Total cases		304		137		83
Manual dilatation	5	1	3	1	4	0
Intrapart. temp.	27	5	11	1	11	2
Version	34	14	20	7	13	4
Uterine pack	36	1	24	2	18	0
Ruptured B.O.W.	68	19	30	7	17	2
Bag or gauze	75	19	38	9	25	5
No cause		80		25		17
Manual removal	83	24	39	5	27	3
P.P. hemorrhage	104	31	55	14	31	9
Other possible causes:						
Pyelitis					6	
Thrombophlebitis					4	
Infected perineum					3	
Breast abscess					2	
Bronchopneumonia					2	
Cystitis					1	
Bartholin's abscess					1	
Ether tracheitis					1	
Dehydration					1	
Influenza					1	
Ether pneumonia					1	
Upper respiratory infection					1	

TABLE V

	DE LEE	BRITISH	STRASSBURG
Dührssen's series	51.4	23.2	14.0
All cases, Oct. 1, 1932, to Oct. 1, 1933	34.5	14.0	6.8
Delivery subsequent to Dührssen's incisions	26.0	10.7	4.5

Maternal Mortality.—Seven women, or 1.18 per cent, were lost in these cases of Dührssen's incisions. There were two anesthetic deaths from ether, one of these being from aspiration pneumonia. One patient died of hemorrhage from abruptio placentae. The patient who survived delivery more than six hours died of subacute bacterial endocarditis with decompensation. Autopsy revealed typical cardiac findings and numerous recent and old infarctions of the spleen and kidney. One patient died in either eclamptic or nephritic coma.

The two remaining patients died from "obstetric shock." One patient lost an estimated 600 c.c. while the other lost only 350 c.c. of blood. In this latter case of sudden death on the table, a diagnosis of thymus death was made. In these two cases the operation must surely be looked upon with suspicion as a strong contributing factor to the shock, if not the sole cause, although both patients received rather long ether anesthesia, one being two hours in duration. The former of these two was returned to her room in good condition with a pulse of 85 and did not appear unduly anemic. She went into shock and died in one hour in spite of stimulants and fluids. No autopsy was granted, but examination of the genital tract revealed no uterine rupture.

All but one of the fatal cases occurred in the first half of the series and neither intravenous fluids nor blood transfusions were used, although several had no appreciable hemorrhage. All the patients who died had ether anesthesia after prolonged labor. In the last 260 cases only one death was encountered. That was of a patient in deep coma when delivery was almost comparable to a posthumous cesarean section. The last 167 consecutive cases up to Jan. 1, 1934, have been free from maternal mortality.

serious enough to be the sole indication for the operative delivery, and in many more there was a combined maternal and fetal indication. Many babies were probably dying or died during the operative extraction, especially by high forceps (Table VI).

TABLE VI. TYPE OF DELIVERY CORRELATED WITH FETAL DEATH

DELIVERY	FETAL DEATHS	NO. DELIVERIES	PER CENT
High forceps	18	86	20.5
Breech extraction	4	32	12.2
Version and extraction	7	66	10.6
Midforceps	17	310	5.5
Low forceps	1	92	1.1

High forceps in this connection means that the fetal head was above the ischial spines as the forceps were applied. It is not synonymous with floating forceps. Only three or four cases of true floating forceps occurred.

The statistics for prolapsed cord (not including "occult" prolapse) are better than the average, namely, 8 deaths out of 18 cases. A mortality of 44.4 per cent which is corrected to 33.3 per cent by deducting 1 monstrosity and 1 previable infant.

Subsequent Labors.—A curiosity regarding the behavior of the incised cervix in subsequent labors was of paramount interest and, in fact, stimulated the present study. Nothing was found in the literature regarding this point. Perhaps because of the transient population of Chicago and the advanced age of many of the patients, a history of only 158 subsequent labors was obtained from a review of the hospital files.

Nineteen deliveries were by cesarean section, chiefly due to previous pelvic dystocia with fetal death. Serious cervical dystocia from dense scarring by previous Dührssen's incisions gave trouble in only six instances. This obstacle was overcome three times by cesarean section, twice by repeated Dührssen's incisions and once by manual dilatation of the cervix with a favorable outcome to mother and baby in each instance.

Labor was quite short, averaging 9.9 hours. Seventy-three patients delivered spontaneously, low or outlet forceps occurred 30 times; 15 patients were delivered by midforceps, 6 by version and extraction, and 4 by breech extraction.

The interval between pregnancies (Table VII) studied in 149 cases showed no predisposition to relative sterility because of Dührssen's incisions. In all patients who could be traced in the records, there were only 6 cases of abortion under thirty-five weeks and 5 premature births over thirty-five weeks. Record of 1 ectopic pregnancy was encountered. Six of the 158 cases had had a trachelorrhaphy between pregnancies, and 7 cervices had been subjected to secondary repair at later deliveries.

TABLE VII. YEARS' INTERVAL BETWEEN PREGNANCIES WITH DELIVERY BY DÜHRSSSEN'S INCISIONS AND NEXT SUBSEQUENT PREGNANCY

Under one	1
One year	45
Two years	45
Three	33
Four	22
Five	5
Six	2
Seven	0
Eight	1

HOSPITALS, ADDRESSES	CHIEF OF SERVICE	APPLY TO	APPOINT- MENTS MADE	NO. OF PTS.	NO. OF BEDS		LENGTH SERVICE	SERVICE BEGINS	NO. OF OB. AND G. APPTS.	SAL- ARY PER MO.	MAIN- TE- NANCE	PRE- VIOUS IN- TERNE- SHIP	AP- POINT- MENT ONLY BY PROMO- TION ?	COMMENT
Mayo Founda- tion Grada- uate School, Rochester, Minn.	Dr. R. D. Mussey*		Oct. 1 and Apr. 1	Ob. 420 Gyn. 500 plus	Ob. 25 Gyn. 4	Fellow in Grad- uate School	3 yr.	Oct. 1 and Apr. 1	1 or 2 yrly.	\$ 70	No	1 yr.	By se- lec- tion	Fellow serves as asst. incl. ap- prox. 1 yr. residency
Ancker Hospi- tal, St. Paul, Minn.	Obstetrics Dr. A. G. Schulze* Gynecology Dr. L. W. Bar- ry*	Supt. of Hospital	March	Ob. 1548 Gyn. 715	Ob. 50 Gyn. 25	Internes Junior Teach- ing Fellows Senior Teach- ing Fellows	1 yr. 2 yr.	July 1 Jan. 1 and July 1 Jan. 1 and July 1	None 1 1	None \$ 50	Yes No	No 1 yr. req.	No	Fellows ap- pointed by Dean, Grad. Sch. U. of Minn.; leads to degree of Ph.D. in Ob./Gyn.
Jewish Hospi- tal, St. Louis, Mo.	Dr. F. J. Taus- sig*	Supt. of Hospital	Dec. 1	Ob. 420 Gyn. 438	Ob. 33 Gyn. 4	Internes (Jr.)	1 yr.	July 1	10g \$ 15	\$ 40	Yes	No	Yes	Rotating serv- ice incl. 10 wk. ea. Ob. and Gyn.
						Internes (Sr.)	1 yr.	July 1	None	\$ 60	Yes	1 yr.	Yes	
						Junior Resi- dents	1 yr.	July 1	1	\$ 60	Yes	1 yr. plus satisf. train- ing	Yes	
						Residents	1 yr.	July 1	None	\$ 80	Yes	2 yr.	Yes	

necessity for the radical procedure. Because of better treatment in the first stage and because of the relatively greater safety of cesarean section, the incidence of Dührssen's incisions should fall but the procedure will remain valuable in a limited field. When the dye has almost irrevocably been cast in favor of delivery from below in long and potentially infected cases, its usefulness is obvious.

3. A series of 592 cases is analyzed. These cases were among the most troublesome of the 40,000 in which they occurred because of the high incidence of, (a) mechanical induction (1 out of 5), (b) overterm pregnancies with large babies, (c) elderly primiparas, (d) occipitoposterior and transverse positions (84 per cent), (e) long labors with poor uterine action, (f) early rupture of the membranes, (g) high incidence of borderline contraction of the pelvis, and (h) difficult endocrine types.

4. Placenta previa is a contraindication for Dührssen's incisions. A second contraindication is dystocia due to: (1) malposition of the fetus, (2) large fetal head, (3) a small pelvis. The procedure is surely not one to be contemplated at the onset of labor as a method of delivery but rather it is often the best available means of meeting an untoward or undesirable exigency. It should not compete with cesarean section in cases of pelvic dystocia.

5. Some patients should have been subjected to cesarean section after a failure in a shorter test of labor.

6. Procrastination, after failure of progress of from six to ten hours with good pains following a protracted labor with the membranes long ruptured and without contraindication, courts increased maternal danger especially from morbidity.

7. The operation is not without some small but real danger to the mother of death from shock and hemorrhage. Dührssen's incisions were directly responsible in only one or two cases for the maternal mortality. Fatal cases were in the earlier portion of the series; all received ether anesthesia and none the benefit of any kind of intravenous therapy.

8. A high morbidity must be expected from the nature of these cases. There were no deaths from puerperal sepsis in the entire series (624 cases until Jan. 1, 1934).

9. Three incisions made to the fornix if necessary are recommended to avoid serious extension.

10. Edema of the cervix is more prone to cause hemorrhage than the nonedematous thick cervix, but more safety is assured with a thin cervix affording good retraction of the uterine vessels and their branches. Effacement, i.e., dilatation of the internal os and retraction of the lower uterine segment, is imperative, before the incisions are made.

11. While the fetal mortality is high (10.3 per cent) some evidence points toward the possible conservation of fetal life. Both fetal and maternal risks are tremendously diminished if a low forceps can be done rather than mid or high forceps.

HOSPITALS, ADDRESSES	CHIEF OF SERVICE	APPLY TO	APPOINT- MENTS MADE	NO. OF PTS.	NO. OF BEDS		LENGTH SERVICE	SERVICE BEGINS	NO. OF OB. AND G. APPTS.	SAL- ARY PER MO.	MAIN- TE- NANCE FEE- SHIP	PRE- VIOUS IN- FERN- SHIP	AP- POINT- MENT ONLY BY PROMO- TION ?	COMMENT
Margaret Hague Ma- ternity Hos- pital, Jersey City, N. J.	<i>Obstetrics</i> Dr. J. F. Nor- ton* Dr. S. A. Cos- grove* Dr. E. G. Wa- ters*	Medical Director	Quar- terly	Ob. 5200 Gyn. None	Ob. 275 Gyn. None	Internes	1-3 mo.	First of each mo.	Ob. 13	None	Yes	No	Through affili- ated hosps.	
Albany Hospi- tal, Albany, N. Y.	<i>Obstetrics</i> Dr. T. O. Gam- ble* <i>Gynecology</i> Dr. J. A. Samp- son	Medical Director (Before Jan. 1)	Feb. 1	Ob. 771 Gyn. 1725	Ob. 36 Gyn. varies	Internes	1 yr.	July 1	16	None	Yes		No	8 spend 6 wk. on Ob.; 12 spend 6 wk. on Gyn.
Cumberland Hospital, Brooklyn, N. Y.	<i>Obstetrics</i> Dr. W. C. Meagher* <i>Gynecology</i> Dr. J. E. Jen- nings	Medical Supt.	Dec. and Jan.	Ob. 1274 Gyn. 450	Ob. 40 Gyn. 24	Internes	2 yr.	July 1	Ob. 1 Gyn. 1	\$ 50	Yes	1 yr.	No	Rotating serv- ice; 2 mo. Ob. 1st yr., 4 mo. 2nd yr.
Jewish Hospi- tal, Brook- lyn, N. Y.	<i>Obstetrics</i> Dr. Joshua Ronsheim <i>Gynecology</i> Dr. L. S. Schwartz*	Profession- al Direc- tor	Dec., for 2nd en- suing year			Internes	6 mo.	Jan. 1 and July 1			Yes	1 yr.	Yes	Gyn. incl. with Surgery; Ob. incl. with Medicine
						Asst. Res.	6 mo.	Jan. 1 and July 1	Ob. 1		Yes	1 yr. and house- ship	Yes	
						Residents	6 mo.	Jan. 1 and July 1	Ob. 1	\$ 50			Yes	

ARGYRIA UTERI

GEORGE GELLHORN, M.D., F.A.C.S., ST. LOUIS, MO.

(From the Department of Obstetrics and Gynecology, Washington University School of Medicine)

THE fact that argyria has not yet been mentioned in gynecologic literature induces me to report the following case of chronic silver poisoning.

A woman of fifty-seven years was referred to me by Dr. O. H. Wilhelmi for treatment of uterine prolapse. She had given birth to two children and was now two years past the menopause. For two years she had been troubled with dysuria, bearing down, and difficulties in locomotion and, on gynecologic examination, presented a very large cystocele, an incomplete prolapse of the uterus and a large polyp springing from the posterior lip of the cervix.

More interesting and pertinent to the subject of this paper were her general appearance and the history of her former health. About five years previously she had been treated for a gastric ulcer with pills containing $\frac{1}{4}$ gr. of silver nitrate which she took three times daily for fifteen months. She discontinued this medication only when she found no relief from her digestive distress. Subsequently she changed her medical attendant and eventually recovered completely.

Although she claimed that she now looked "50 per cent better" than five years age, she still presented a typical picture of pronounced argyria. The skin of her face, neck, and hands was of a dark slaty color. The surface of the body which had not been exposed to direct sunlight was less deeply pigmented, yet definitely grayish in appearance. The tip of her nose and the lips appeared cyanotic; the cartilaginous parts of the external auditory canal, bluish gray; the tympanum, dark. The sclerae were slightly icteric; the conjunctivae and buccal mucosa, bluish. The gums alone were normal in color; all her teeth had been extracted years before she took the silver nitrate pills. The finger nails had that deep gray discoloration that one may see in the dead. The protruding vaginal walls were more grayish than blue.

The genital affection clearly called for surgical intervention, but her general appearance was somewhat intimidating. A search in the literature for specific guidance was unsuccessful. A very thorough general examination, however, revealed perfectly normal conditions of heart, lungs, and kidneys. Blood pressure, clotting time, nonprotein nitrogen, and blood count were likewise entirely normal. Under these circumstances I felt justified in performing the operation. The latter consisted of a vaginal hysterectomy with the technic described elsewhere,³ and a perineorrhaphy, both under local anesthesia, and both procedures were carried out painlessly and bloodlessly. Her recovery was undisturbed. All wounds healed by primary union; the patient left the hospital in fourteen days, and resumed her household duties four weeks later.

Of special interest was, of course, the condition of the uterus. This organ was immediately after removal wrapped in a towel so as to eliminate any possible effect of daylight, and taken to the laboratory. The outside seemed unchanged as to

HOSPITALS, ADDRESSES	CHIEF OF SERVICE	APPLY TO	APPOINT- MENTS MADE	NO. OF PTS.	NO. OF BEDS		LENGTH SERVICE		NO. OF SERVICE BEGINS	NO. OF OB. AND G. APPTS.	SAL- ARY PER NO.	MAINTENANCE TE- PERNE- SHIP	PRE- VIOUS IN- SHIP	AP- POINT- MENT ONLY BY PROMO- TION ?	COMMENT
Mt. Sinai Hos- pital, New York, N. Y.	Attending Gynec. Dr. R. T. Frank*	Director of Hospital		Ob. 5	None	Internes	29 mo.		July 1			Yes	No	By ex- amina- tion	Rotating serv- ice incl. 1 mo. Gyn.—no Ob.
				Gyn. 600	Gyn. 37	Asst. Res.	6 mo. 12		Feb. 1 and Aug. 1	Gyn. 2	\$ 45	Yes	2 yr.		
						Residents	6 mo. 12		Feb. 1 and Aug. 1	Gyn. 2	\$ 45	Yes		Yes	
New York Hos- pital, New York, N. Y.	Dr. H. J. Stander*	Supt. (Be- fore Jan. 1)	1st Tues. in Feb.	Ob. 3800	Ob. 137	Junior Internes	1 yr.		July 1	10	None	Yes	1 yr.		Full time on Obstetrics
				Gyn. 1200	Gyn. 40	Senior Internes	1 yr.		July 1	4	\$ 25- \$ 50	Yes	2 yr.	Yes	Rotation betw. Ob. and Gyn.
						2nd Asst. Resident	1 yr.		July 1	3	\$ 25- \$ 50	Yes	3 yr.	Yes	Rotation betw. Ob. and Gyn.
						1st Asst. Resident	1 yr.		July 1	2	\$ 25- \$ 50	Yes	4 yr.	Yes	Rotation betw. Ob. and Gyn.
						Residents	1 yr.		July 1	1	\$100	Yes	5 yr.	Yes	In charge of both services
New York Nursery and Child's Hos- pital, New York, N. Y.															Private and semiprivate Ob. cases only; no ward cases
															No obstetrics
New York Post- Graduate Hospital, New York, N. Y.	Gynecology Dr. W. T. Dann- reuther*	Supt. of Hospital		Ob. None	None	Internes	27 mo.		Qtrly.		None	Yes	No		
				Gyn. 338	Gyn. 37	Residents	1 yr.		Oct. 1	Gyn. 1	\$ 90	Yes	2 yr.	Pre- ferred	

cells which fill their lumina. This interesting phenomenon is *not* an artefact. A dense shower of minutest black dustlike particles extend diffusely throughout the musculature. The superficial epithelium of cervix and endometrium are even now quite free, and in the uterine mucosa the distribution of silver deposits corresponds to that observed in the earlier sections.

DISCUSSION

Argyria is nowadays much less common than it was in former years. Its etiology is twofold: occupational and medicinal. There used to be many cases of chronic silver poisoning among silver miners, silver-smiths, silver leaf workers, and those engaged in the industry of silvering glass pearls,^{5, 8, 16} but modern methods of hygiene have largely removed this vocational hazard.

The medicinal factor manifested itself at the time when silver nitrate, given by mouth, was commonly used in the treatment of epilepsy, chorea, tabes, and, later, of gastric ulcer.^{4, 7, 12} The recognition of the inefficacy of this therapy and its subsequent abandonment checked the further production of argyria. More recently, however, protracted use of overdoses of colloidal silver preparations such as argyrol, protargol, collargol, and neosilvol, principally for catarrhal conditions of the respiratory passages or for the prevention of such conditions, has brought forth a new crop of cases of argyria, this time chiefly in children.^{10, 11, 14, 17} Even long-continued topical applications of solutions in chronic conjunctivitis or lid eczema are known to have been followed by argyrosis.

The chemical industry is constantly putting new preparations of this sort on the market with trade names which do not suggest their silver content. A case in point is the German *adsorgan* to which already several instances of chronic silver poisoning have been traced.^{7, 13} That an overdose of silver-arsphenamine may be productive of argyria has been shown by Becker and Ritchie¹ on two cases, and the same may be true of intravenous collargol injections which enjoyed a brief popularity in puerperal sepsis.

The silver which enters the organism in excessive amounts, whether swallowed or absorbed from the visible mucous membranes, permeates the entire body and is deposited in *all* organs and tissues where it becomes permanently fixed in the form of very small and nearly even-sized black or grayish granules.^{4, 12} The resulting pigmentation is most striking in the skin, lymph nodes, glomeruli, and choroid plexus of the ventricles. No part of the body is exempt though the brain substance itself seems least affected. The outer appearance of patients with pronounced argyria is, indeed, startling and unforgettable to any one who has seen them; they almost resemble corpses that have suddenly come to life. My patient unquestionably was of this category. In her case, too, the discoloration of all visible mucous membranes, the external auditory canal, and the tympanum corresponded to the de-

dark brown layer of pigment and the intracellular substance of the epithelium was deeply impregnated with pigmented granules and gave the multiple squamous epithelium the appearance of a network. Dworzak used silver nitrate solution experimentally on a number of cases of erosion and polyp and found that impregnation always took place after two days. Though in his cases the effect of the topical application of silver nitrate remained localized upon the surface, the report is here interposed for the sake of completeness.

The amount of silver intake sufficient to produce argyria, and the time of its first outward manifestations range between wide limits. The case reported by Koelsch⁹ where 2 gm. were taken within two months, thus far represents the minimum record. In the necropsy conducted by Goettler and others,⁴ the silver content of the entire body was estimated as between 90 and 100 gm. My patient took at least 150 gm. during a period of fifteen months, but the first signs of argyria appeared about nine months after starting the treatment. In Lundy's case¹⁰ between 200 and 300 gm. of neosilvol were used as nose drops for three and one-half years before any marked discoloration was noticed; and in the case reported by Knack⁷ argyria did not become manifest until five years after the first medication.

It is obviously due to the utter lack of tissue response which is quite unlike the cellular reaction to other foreign bodies, that the general health is not affected in argyria. This is uniformly stated in all published reports; and in the description of my own case I have emphasized that all bodily functions and findings were unimpaired. It is precisely for this reason that Petri¹² questions whether we are quite justified in classifying argyria among the chronic poisonings.

Therapeutically the condition is unchangeable. Stillians and Lawless¹⁵ produced localized areas of argyria by injecting a mild silver protein solution into their own arms. They succeeded in removing the bluish discoloration by injecting into the affected spots a solution containing 0.25 per cent potassium ferrieyanide and 6 per cent sodium thiosulphate, thus imitating a photographic reduction process which gives equally good results with fresh or old negatives. Interesting as this experiment is, it has, of course, no practical applicability in our problem.

SUMMARY

Argyria or chronic silver poisoning, once a fairly common condition, has now become a rare disease for reasons set forth in the body of this paper. Afflicted persons present an appearance of such startling singularity that in a pronounced case the diagnosis is unmistakable. The silver permeates the entire body and is deposited in all organs and tissues in the form of minute granules without producing the usual foreign body reactions. Argyria has not yet been mentioned in the gynecologic literature of the world because all published records deal only with men or children. A fortuitous chance gave the author the opportunity to remove the uterus in a woman with a very pronounced argyria and to add his histologic studies of this organ to the chapter on chronic silver poisoning.

HOSPITALS. ADDRESSES	CHIEF OF SERVICE	APPLY TO	APPOINT- MENTS MADE	NO. OF PTS.	NO. OF BEDS		LENGTH SERVICE	SERVICE BEGINS	NO. OF OB. AND G. APPTS.	SAL- ARY PER MO.	MAIN- TE- NANCE	PRE- VIOUS IN- TERNE SHIP	AP- POINT- MENT ONLY BY PROMO- TION ?	COMMENT
Hospital of Univ. of Ore. Med. Sch., Portland, Ore.	Dr. R. E. Watkins*	Dean of Univ.	Jan. 1	Ob. 701 Gyn. 993	Ob. 30 Gyn. 50	Residents	3 yr.	July 1	1	\$ 30 \$ 45 \$ 55	Yes	Yes	No	Gyn. and Ob. combined
Multnomah Hospital, Portland, Ore.	Dr. R. E. Watkins*	Director of Hosp.	Internes: Dec. 1	Ob. Gyn.	Ob. Gyn.	Internes Residents	1 yr.	July 1	16g 3	\$ 20 \$ 35	Yes	Yes		Rotating, 2 mo. Ob. included
Graduate Hos- pital, Phila- delphia, Pa.	Dr. W. R. Nicholson* Dr. B. C. Hirst	Grad. Sch. of Med.	Feb. 15	Ob. 915 Gyn. 309	Ob. None Gyn. 40	Internes Residents	2 yr. 1 yr.	July 1	8g Gyn. 1	None	Yes	No		Rotating; 6 wk. Gyn. here; to Univ. Hosp. for 6 wk. Ob.
														Appointees must com- plete course in Ob. and Gyn. Grad. Sch., U. of Pa.
Hospital of the Univ. of Pa., Phila- delphia, Pa.	Dr. C. C. Norris* Dr. F. E. Keene*	Chief of Service (betw. Jan. and May)	May 1	Ob. 921 Gyn. 1123	Ob. 45 Gyn. 351g	Internes Residents	2 yr. 1 yr.	July 1 Sept. 1		None	Yes	No		Rotating serv- ice incl. 2 mo. Ob. and Gyn.

found midway between menses. Fig. 3 shows the concentric rings more broken in their continuity. This picture is assigned to a few

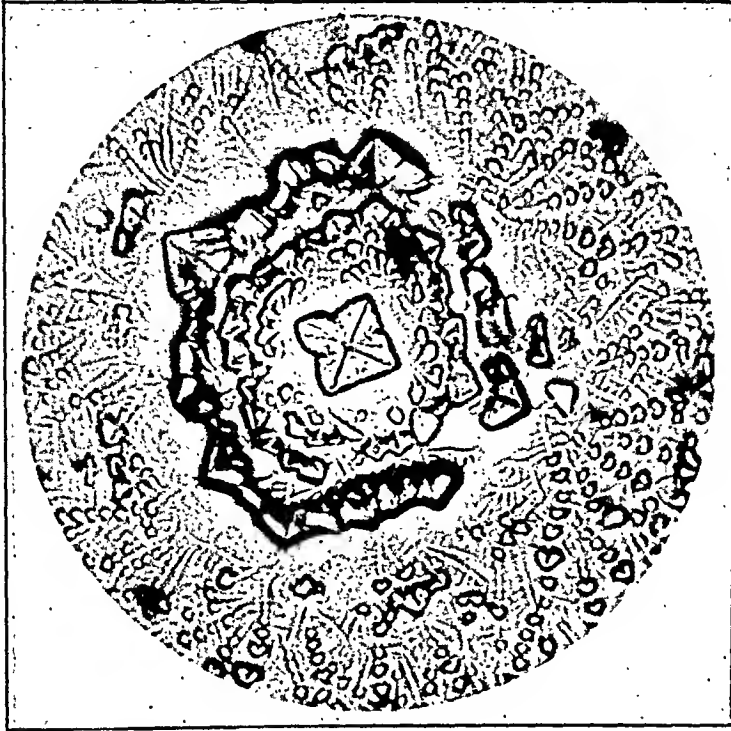


Fig. 1.—"Bastioned." Early postmenstrual.

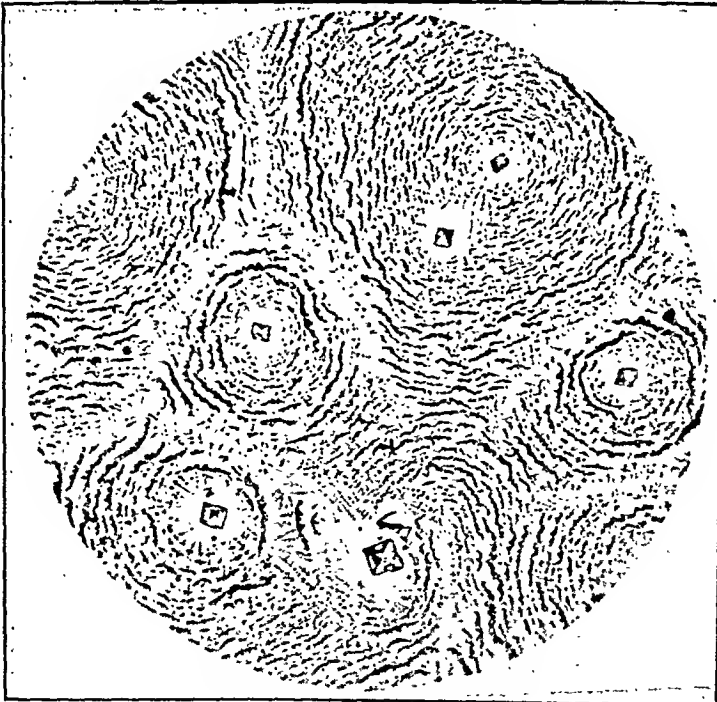


Fig. 2.—Ringed. Intermenstrual.

days premenstrual. We have added two types to these three described by V. Bergauer and others. We found that Fig. 4, distinctly radiant,

HOSPITALS, ADDRESSES	CHIEF OF SERVICE	APPLY TO	APPOINT- MENTS MADE	NO. OF PTS.	NO. OF BEDS		LENGTH SERVICE	SERVICE BEGINS	NO. OF OB. AND G. APPTS.	SAL- ARY PER MO.	MAIN- TE- NANCE	PRE- VIOUS IN- TERNE SHIP	AP- POINT- MENT ONLY BY PROMO- TION ?	COMMENT
Elizabeth Steel Magee Hos- pital, Pitts- burgh, Pa.	Obstetrics Dr. C. J. Barone	Supt. of Hospital	March or April	Ob. 2958 Gyn. 961	Ob. 136 Gyn. 65	Internes	1 yr.	July 1	18	None	Yes	No		Rotating serv- ice, incl. 60 days Ob., 40 days Gyn.
	Gynecology Dr. R. R. Ing- rams					Residents	1 yr.	Aug. 1	6	\$41.66	Yes	Yes	Usually	
	Dr. S. A. Chal- fant*													
Memphis Gen- eral Hospi- tal, Memphis, Tenn.	Dr. B. Z. Cash- man													
	Obstetrics Dr. W. T. Price*	Internes: to Interne Commit- tee, Resi- dents: to Chief of Service		Ob. 1869 Gyn. 859	Ob. 70 Gyn. 40	Internes	18 mo.	10th ea. month	1 ea. mo	\$ 20	Yes	No	By class stand- ing	Rotating serv- ice incl. 2 mo. Ob., 1 mo. Gyn.
	Gynecology Dr. W. T. Black*					Residents	1 yr.	July 1	Ob. 1 Gyn. 1	\$ 65	Yes	Yes	No	
Vanderbilt Uni- versity Hos- pital, Nash- ville, Tenn.	Dr. L. E. Burch*	Chief of Service	Apr. 1	Ob. 359 Gyn. 392	Ob. 11 Gyn. 11	Internes	1 yr.	July 1	2	\$23.75	Yes	Yes		Ob. and Gyn. combined
						Asst. Res.	2 yr.	July 1	2	\$35.41	Yes	Yes	Usually	
						Residents	1 yr.	July 1	1	\$75.00	Yes	Yes	Usually	

V. Bergauer and others describe the simple technic for these observations. They emphasize the importance of uniform drying temperature and of uniform dilution. A dilution of 1 to 10 is satisfactory. We use a standard white blood corpuscle counting pipette, drawing the blood up to the 0.1 c.c. mark and filling the bulb to the 1 c.c. mark with normal saline solution. It is not absolutely necessary to remove the corpuscles, but we do centrifuge the dilution. A drop of the clear fluid is deposited on a slide, which is dried in the incubator at 37° C. for twenty-four hours.

We have other evidence that the hormone content of the blood varies at different periods of the menstrual cycle. For example, Frank and others² state, "40 c.c. of blood regularly give a positive reaction

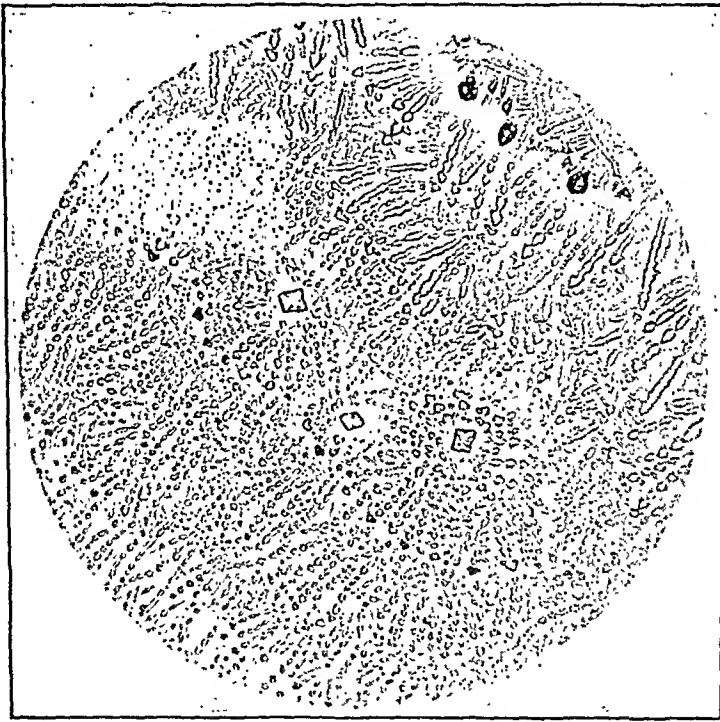


Fig. 5.—Large asters. Toxemias.

(for theelin) some twenty-one days before the onset of the menses; 30 c.c. are positive between the twenty-first, and fourteenth day; 20 to 10 c.c. are positive from the seventh day preceeding the period until menstruation." The theory that pregnancy toxemia and eclampsia may be due to increased amounts of circulating hormone, as expressed recently by Hofbauer² and others, is supported by Frank's² sentence, "By the sixth week of pregnancy, the reaction with 8 to 10 c.c. of blood is regularly positive." Of course, not merely is the gonadotrophic hormone thus increased in pregnancy, but also progestin and many or all of the other hormones.

V. Bergauer and others had worked only with blood from nonpregnant women. If the patterns are altered by changing hormone con-

CANADA

The data used below were obtained from a booklet entitled "Summary of Senior Internships and Residencies in Specialties in Canadian Hospitals," published by the Department of Hospital Service, Canadian Medical Association, and revised in 1935. For information as to first year Internships at these hospitals, candidates are referred to the booklet entitled "Hospitals in Canada Which Are Approved for Internships," published by the same Department. No attempt has been made by the American Board of Obstetrics and Gynecology to give its "approval" to the various appointments listed below.

HOSPITALS, ADDRESSES	CHIEF OF SERVICE	APPLY TO	APPOINT- MENTS MADE	NO. OF PTS.	NO. OF BEDS		LENGTH SERVICE BEGINS	NO. OF OB. AND G. APPTS.	SAL- ARY PER MO.	MAIN- TE- NANCE	PRE- VIOUS IN- TERNE SHIP	AP- POINT- MENT ONLY BY PROMO- TION ?	COMMENT
St. John Gen- eral Hospital, St. John, New Bruns- wick							2 yr.		\$ 25	Yes			Rotating, 13 wk. Ob., 13 wk. Surg., etc.
							1 yr.	None	\$ 50				
Montreal Gen- eral Hospital, Montreal, Quebec		General Supt.	Dec.		Total beds 600		1 yr.	Gyn. 1	None	Yes	1 yr. rotat- ing req.		
Royal Victoria Hospital, Montreal, Quebec		Supt. of Hospital (Before Dec. 15)	End of year		Total beds 700		1 yr.	July 1	\$ 80	Yes	Yes		Teaching hosp., McGill Univ. Nonrotating serve

INTERSTITIAL RADIATION OF THE CERVIX, WITH A SUGGESTED MODIFICATION OF TAUSSIG'S OPERATION*

CAMERON DUNCAN, M.D., F.A.C.S., BROOKLYN, N. Y.

(From the Department of Gynecology and Obstetrics of Kings County Hospital)

THE therapy of carcinoma of the cervix is still in the experimental stage. The results in most clinics are not too gratifying.

The radical hysterectomy of Wertheim, or the radical vaginal hysterectomy of Schauta and Pezzer are only applicable to the Group I cases, and are attended by a high operative mortality.

The usual roentgen and radium irradiation that is so extensively used, fails so frequently, only giving a short period when the cervical lesion heals, and the patient has a feeling of well-being, gain of some weight, only to be followed in a few months by parametrial or glandular metastases, with continued progress of the growth. The roentgen therapy is continued then with no avail.

The wave length of our 200 kilovolt roentgen machines cannot equal the gamma rays of radium. Hence they are not as effectual in destroying the neoplastic cells as the radium was in primary growth.

When we consider that the gamma rays of radium decrease in direct proportion to the square root of the distance, we can readily see that glandular or parametrial metastases will not be destroyed by these rays.

It is the belief of Taussig¹ and many others that the lymph gland metastases are more radioresistant than the primary growth.

With these facts in view we are searching for a method to control the progress of extension in our cases, and have tried interstitial radiation in a few cases by implanting radon seeds by the abdominal route.

Interstitial radiation with radon seeds was first employed by Janeway in 1915. Since then it has been used by many others, and in recent years by Taussig¹ and Gellhorn.²

Delporte and Cahen³ use interstitial radiation with radium element in needles implanted in the lower uterine segment and capsules implanted between the layers of the broad ligaments. This is done six weeks after their original radiation of the cervix.

Cancer of the cervix spreads by directed extension in the tissues and by glandular metastases. In the direct tissue extensions occurring a few months after initial radiation some cases may be controlled by implanting radon seeds from the vaginal route, but can be reached more effectually by the abdominal route.

*Read at a meeting of the Brooklyn Gynecological Society, October 4, 1935.

HOSPITALS, ADDRESSES	CHIEF OF SERVICE	APPLY TO	APPOINT- MENTS MADE	NO. OF PTS.	NO. OF BEDS	LENGTH SERVICE	SERVICE BEGINS	NO. OF OB. AND G. APPTS.	SAL- ARY PER MO.	MAIN- TE- NANCE	PRE- VIOUS IN- TER- NE SHIP	AP- POINT- MENT ONLY BY PROMO- TION ?	COMMENT
Vancouver Gen- eral Hospital, Vancouver, B. C.		Secretary, Internic Commit- tee	Dec.		Ob. 111	Senior Appts.	1 yr.	July 1	1	\$100 less 10%	Yes		Total beds 1,037
St. Joseph's, Baltimore, Md.	Dr. W. W. Gray Dr. Leo Brady Dr. E. Harrison Dr. T. K. Gal- vin	Secretary Executive Com- mittee	Dec.	Ob. 612 Gyn. 402	Ob. 33 Gyn. 30		1 yr.	July 1	2	None	Yes	Usually	Rotating serv- ice.

*Diplomate, American Board of Obstetrics and Gynecology.

5. In the column giving "No. of Ob. & Gyn. Appts.," small letter "g" means the total number of general rotating internes was given, rather than the number specifically reserved for obstetrics/gynecology. In many cases the figure supplied to us by the Hospital seemed too large to be the number of internes reserved for this specialty; in other instances the hospitals stated on the questionnaire that the figure given us was general rather than specific.

NE, Newborn, IP, Inpatient, OP, Out-patient.
Additional private beds available. Included in medical.
851 patients admitted on Surgery, approximately one half being gynecologic patients. Beginning July 1, 1935, gynecologic patients to be admitted under that heading, not included under Surgery as previously.

Beds or patients not segregated.
The three months obstetric service in out-patient department is available only to half the total number of internes.

Part clinic, part private. Included in general surgery.

No limit. Obstetrics=1 service of 29 rooms; ward service of 8 and 12 beds each.
Including all adult surgery; gynecology not kept separate. 150 beds for medical and surgical patients.

plus Rochester Municipal Hospital obstetric and gynecologic patients totalling 2,088 and beds totalling 60.

Subject to renewal. And 12 internes have one month on Gynecology.

Living births; number of obstetric patients not specific. Nine emergency or operative cases last year.

Including 31 ward beds, 4 semiprivate beds. Private gynecology beds can be supplied as required.

This figure does not include gynecologic beds in department of Surgery and Gynecology.

Gynecologic patients number 300 hospital cases, 8,100 out-patient department.

Less such percentage deductions as may be in force from time to time.

The following hospitals did not respond to re-check questionnaire sent out by this Board. Therefore, the data obtained and used from the following hospitals at the time this survey went to press may not be up to date: Chicago Maternity Center (Chicago); Charity Hospital (New Orleans); Mercy Hospital (Baltimore); St. Mary's Group of Hospitals (St. Louis); Barnes and St. Louis Maternity Hospitals (St. Louis); Jewish Hospital (Brooklyn, N. Y.); New York Nursery and Child's Hospital (New York City); Rochester General Hospital (Rochester, N. Y.); Multnomah Hospital (Portland, Ore.); Philadelphia General Hospital (Philadelphia).



Fig. 1.—Roentgenogram of gold radon seeds implanted in the parametrial metastasis of the case reported.



Fig. 2.



Fig. 3.

Fig. 2.—Roentgenogram of intravenous urography taken six months after implantation of gold radon seeds in a left parametrial metastasis. Shows absence of the left kidney or complete loss of function which occurs very early after complete obstruction of the ureter. The left ureteral opening could not be found on cystoscopy. The urography should have been done prior to radiation.

Fig. 3.—Roentgenogram of intravenous urography taken four months after interstitial radiation with gold radon seeds. Shows obstruction of the lower left ureter with dilatation of the ureter and kidney pelvis with beginning loss of function due to a metastasis to the base of the bladder. The function of the right kidney is still good.

Operations are not always safe and operative interference is not always necessary. In the last published reports eight teaching hospitals in this country record forty-four deaths among their own booked cases, and of these twelve (27 per cent) followed cesarean section in originally "clean" cases, with most of the deaths due to general peritonitis. Self-criticism may be a help in the advancement toward mortality reduction.

F. L. ADAIR AND I. BROWN.

Cassie, Ethel: Are We Satisfied With the Results of Ante-Natal Care? *Brit. M. J.* 2: 197, 1934.

Antenatal care is not kept up to the minimum standards due not only to the faults of administration or faults in doctors or midwives but also to the women themselves. The average attendance per patient was 3 prenatal visits; and as there are many who make 5 to 8 visits, there must be some who make only one. Fifty-seven out of 87 patients with intercurrent disease showed inadequate prenatal care. In 64 of the 68 toxemias there was not enough prenatal care and in some none at all. The author suggests raising the health standard of the nation and also careful medical supervision during pregnancy.

Inadequate training of medical students and midwives is a factor. Often teachers are too few and are frequently overworked. However, antenatal work is "progressing as well as can be expected."

F. L. ADAIR AND I. BROWN.

Buchan, George F.: Are We Satisfied With the Results of Ante-Natal Care? *Brit. M. J.* 2: 199, 1934.

Objectives of antenatal care are as follows: (1) Maintaining the health of the pregnant woman, (2) delivery with the least disturbance to the woman, (3) birth of a healthy, full-term child, and (4) an adequate supply of breast milk for the child during lactation.

The health visitor should check on home conditions as well as on the cause of nonattendance to the prenatal clinic. (1) The prenatal health officer must be able to advise concerning the hygiene of pregnancy as well as the medical examination; (2) he should make inquiry into failures in keeping appointments; (3) the obstetrician making prenatal examinations should be in charge of the confinement and have sufficient experience to cope with any abnormality whether foreseen or not; and, (4) hospital beds should be available to those needing such accommodations.

Records must be kept by the physicians of all the important details of the individual case.

F. L. ADAIR AND I. BROWN.

Reiprich, W.: A New Rapid Pregnancy Test for Urine, *Wien. klin. Wchnschr.* 12: 1441, 1933.

The author describes a new and rapid urine test for pregnancy. He uses immature rats in which large amounts of urine (10 to 25 c.c.) can safely be injected. When positive, the reaction is definitely present in twenty-four to thirty hours and can be determined macroscopically. A positive reaction is evidenced by marked hyperemia and a hypertrophy of the ovary (3 or 4 times that of the control animals). Rats are apparently more sensitive to the hormone than are mice. They also respond more rapidly.

RALPH A. REIS.

SUGGESTED MODIFICATION OF TAUSSIG'S OPERATION

Taussig's technic consists of a bilateral salpingo-oophorectomy with lymphadenectomy of the primary lymph glands, the iliac, obturator, and ureteral, with implantation of radon seeds at the bifurcation of the iliac vessels and in the sacrouterine ligaments. This is done as an initial procedure and radium is inserted into the uterus and cervix at the same time.

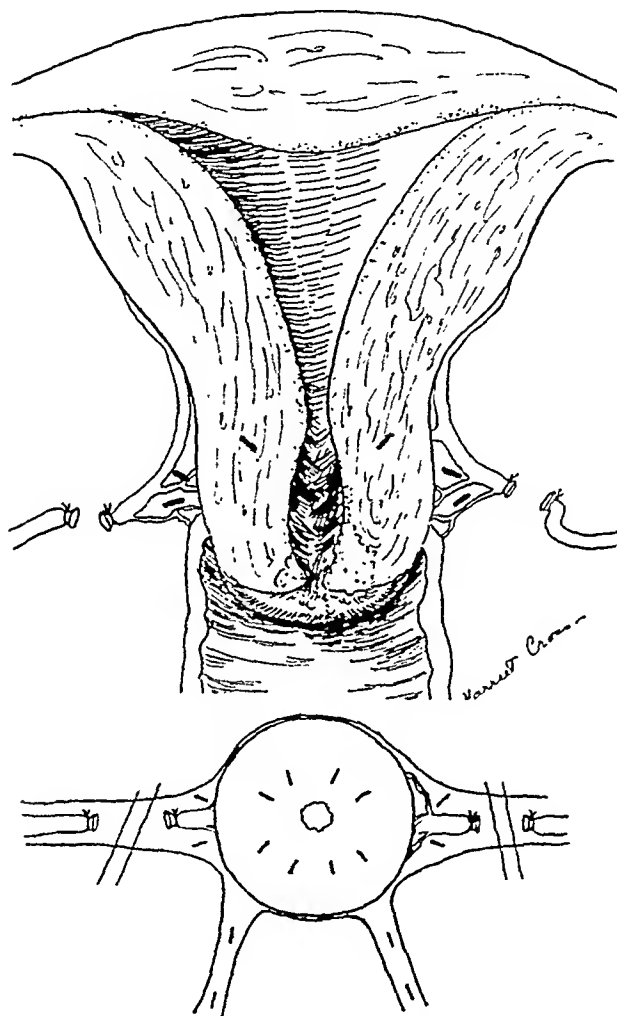


Fig. 5.—The upper diagram shows the uterus with the uterine arteries resected. Radon seeds implanted in the parametria and lower uterine segment. The lower diagram is a cross-section of the uterus showing the clockwise arrangement of 8 radon seeds implanted in the lower uterine segment and 2 seeds in each broad ligament close to the uterus, enough distance from the ureters not to cause marked fibrosis and contraction. Two seeds are implanted in each sacrouterine ligament.

I wish to suggest the following modification to his procedure:

1. That the patient receive the initial roentgen and radium irradiation locally two months prior to operation. That the radium dose not exceed 6,000 mg. hours.
2. That the blood supply of the uterus be reduced by the resection of the uterine arteries (Fig. 4), as reduction of blood supply decreases the spread of malignant tumors.

Abnormal separation of the symphysis pubis occurs in about 25 per cent of the cases and probably results simply from an exaggeration of the normal physiologic process. Only exceptionally does trauma play any part.

Symphyseal relaxation is accompanied by an increase of pubic mobility and is frequently associated with characteristic symptoms resulting from instability of the pelvic joints.

Treatment is indicated to relieve symptoms and to prevent the development of a condition of chronic relaxation of the pelvic joints which is frequently responsible for a great deal of later discomfort among women who have borne children.

The key to the situation lies in prompt recognition of abnormal separation of the symphysis when present, and in order to detect this the obstetrician should include the symphysis pubis in his regular routine of examination of the pregnant patient both antepartum and at the time of delivery.

WILLIAM C. HENSKE.

Buddee, F. W.: The Ante-Natal Use of Quinine, *Brit. M. J.* 1: 1159, 1934.

Quinine decreases the power and increases the frequency of uterine contractions and therefore does not hasten delivery. In large doses it is a protoplasmic poison. The idiosyncrasy to quinine of some patients is discussed. Quinine hydrochloride was given in 5 gr. tablets every night. Labor began at varying times, within three to fifty-four days. There was no relation between the number of doses and the duration of labor. Quinine acts as a stimulant and general tonic, in small doses; the patients feel well and are often improved. There were no cases of fetal intoxication. Incidence of infection is usually reduced because of the increased resistance. Idiosyncrasy against quinine often causes premature labor.

F. L. ADAIR AND I. BROWN.

Guidetti, Ettore: Maternal Diet and Fetal Reserve of Vitamine A, *Ginecologia* 5: 597, 1935.

The author determined by the Carr and Price reaction the amount of vitamin A in the neonatal liver of rabbits and guinea pigs, and found variable values, from seventeen to forty Moore units per gram. The fetal liver reserve is not influenced by a maternal diet rich in vitamine A and the reserve value, calculated in terms of units of Moore, is the same in fetuses born from animals on either normal diet or a hypervitamin diet.

AUGUST F. DARO.

Orri, M.: A Study of the Calcium-Potassium Constant of the Organs During Pregnancy, *Folia gynaeec-demograph.* 31: 403, 1934.

In experimental studies made on various organs during gestation, in comparison with normal controls, in regard to their calcium-potassium contents, the author demonstrates: (1) that during pregnancy there is a tendency in all the organs, and especially in muscle, toward a diminution in the concentration of the cations therein contained; and (2) that the diminution is not constant for all the elements considered; there is an alteration in the coefficient toward potassium in muscle, toward calcium in the liver. These variations may be due either to the needs of the fetus or to the labile character of electrolytes, which is generally found during pregnancy.

MARIO A. CASTALLO.

highest incidence is reported by Ward who found that in 5.2 per cent of 1,773 cases of epithelioma of the skin, the tumors were multiple. However, his investigation was confined to epithelioma of the skin.

A comparison of the incidence of multiple malignant tumors of the same organ, and of different organs of the same patient, reveals that the former are much more rare. According to Warren and Gates, the skin is the organ which is most frequently the site of multiple primary malignant tumors. The large intestine, pharynx, and stomach, in the order named, are the next most frequent sites. Thus, it may be seen that multiple primary malignant tumors of the uterus are unusually rare. Eighteen cases have been reported previously. Twelve were collected by Warren and Gates. Of these, seven were reported as adenocarcinoma and squamous cell carcinoma, and the remaining five were designated as adenocarcinoma and carcinoma, or as double carcinoma. Major found five other cases of multiple malignant tumors of the uterus. In four of these cases adenocarcinoma was associated with sarcoma, and in the other case adenocarcinoma was associated with a squamous cell epithelioma. Hurt and Broders found a uterus which contained an adenocarcinoma, Grade 4, of the fundus and polyp which disclosed an adenocarcinoma, Grade 1.

REPORT OF CASES

CASE 1.—A married woman, aged forty-four years, came to the clinic because of excessive bleeding from the vagina. Her mother had died of carcinoma of the uterus and a sister had died of carcinoma, which the present patient thought had involved the uterus. The patient previously had been in good health and the menstrual cycle had been normal. She never had been pregnant.

Six months before she came to the clinic, her menstrual period had not ceased, but a small amount of flow had continued and two to three pads had been required each day. At times, the amount of flow had increased and had been associated with dull pain in the lower part of the abdomen. Three months before she registered at the clinic, she had noted a yellowish vaginal discharge that had been mixed with the blood. Her physician had performed a dilatation and curettage. A diagnosis of carcinoma of the fundus uteri had been made, and 50 mg. of radium was inserted for forty-eight hours. Two weeks later roentgenotherapy had been employed. A month later the bleeding had stopped but the yellowish discharge had continued. She had lost 5 pounds (2.3 kg.) since the onset of her symptoms.

Physical examination at the clinic revealed a pale, obese woman who weighed 173 pounds (78.5 kg.). There was slight tenderness in the lower part of the abdomen. The cervix was eroded and bled easily, but did not suggest a definite malignant appearance. The uterus was about two times normal size, irregular, and fixed posteriorly. Examinations of the blood and urine did not reveal anything abnormal. A roentgenogram of the thorax was normal.

Operation was advised and a total abdominal hysterectomy with bilateral salpingo-oophorectomy was carried out. Two weeks later, after an uneventful convalescence, deep roentgenotherapy was applied to four areas on the anterior, posterior, and lateral aspects of the pelvis, on four consecutive days.

A mixed squamous-cell epithelioma, Grade 3, and an adenocarcinoma which measured 4 by 4 by 1 cm. were found at the internal os of the uterus (Figs. 1, 2, and 3). In addition, there was an adenocarcinoma, Grade 1, lying for the most part in the left uterine horn. It was 4 by 2 by 1 cm. in size. The fallopian tubes and ovaries were atrophic. There was a fibroma 1 cm. in diameter in the right ovary.

CASE 2.—A single woman, aged forty-one years, came to the clinic because of continuous spotting of blood from the vagina, which had been present for eighteen months. There was no family history of carcinoma. Prior to the onset of the present symptoms, her menstrual periods had been perfectly normal in amount and had occurred regularly. Eighteen months before she came to the clinic, her menses

Sjovall, A.: *Decidual Reactions in the Tubal Mucosa in the Presence of Intra-uterine Pregnancy*, *Acta obst. et gynec. Scandinav.* 15: 68, 1935.

The author examined the fallopian tubes of 84 women with an intrauterine pregnancy and found a decidual reaction in only 10 of them. Even in these cases the areas of decidual change were small and isolated. Hence, decidual reaction in the tube in the presence of intrauterine pregnancy is infrequent. The author believes that inflammatory reaction and toxic influences predispose to the formation of the decidua.

J. P. GREENHILL.

Petti, Andrea: *Effect of Morphine and Paramorphine Upon the Gravid Uterus*, *Arch. di ostet. e ginec.* 20: 120, 1933.

Petti studied the action of morphine and paramorphine upon the gravid and nongravid uterus of the cat.

The action of morphine depends upon the dose given. Doses of 1/2500 or even 1/1000 gr. produced an increase in tone, and increase in the number of contractions, a diminution in amplitude and some irregularity, while doses of 1/100 gr. produced a complete loss of force without completely inhibiting the contractions.

Paramorphine in doses of 1/1000 gr. has a double action acting either like morphine or inhibiting the rhythmical contractions completely. The paramorphine always makes the contractions regular even when they were irregular before its administration.

JAMES M. PIERCE.

Sorrentino, Benjamino: *Motor Dysfunctions of the Kidney Pelvis and Ureter During Pregnancy and the Puerperium*, *Clin. ostet.* 37: 321, 1935.

The author reviews the various theories of the etiology of urinary stasis during pregnancy and the puerperium. Hirsch, Weibel, Pestalozza, Zangemeister among others believe that urinary stasis and dilatation of ureter and renal pelvis were due to mechanical factors, whereas Kehrner in 1912 and Rumpel in 1921 proposed the dynamic theory as a causative factor.

In a preceding paper the author was able to show on 136 cases that the mechanical factors play little if any part in determining the motor function and the alteration of the kidney pelvis and ureter during pregnancy.

His present work was performed by injecting an indigo carmine preparation (Merck) intravenously and observing its escape from the ureteral opening by cystoscopy. This procedure he calls chromocystoscopy. In a kidney that functions normally the elimination of the color is initiated after three to five minutes, reaches a maximum color intensity after ten minutes, maintains such intensity from ten to fifteen minutes and then gradually decreases until the elimination ends after thirty minutes. During pregnancy and the puerperium he was able to show curves of elimination that greatly differed from the normal type. The initial appearance of the color may be retarded, the elimination terminating quickly, without reaching maximum of color intensity, which he calls "short elimination." The initial appearance may be retarded without reaching a maximum intensity of color, yet the ejaculations are always of the same intensity and quality of color—the latter form he calls "monotonous elimination." On the other hand, the initial appearance may be retarded, the maximum intensity of color never reached, but the elimination period may be longer than normal—this he calls "prolonged elimination." He describes the character of the ejaculation and its significance.

The author concludes by affirming the importance of chromocystoscopy in the study of pyelo-ureteral function during pregnancy and the puerperium. It can



Fig. 3.—Section of the adenocarcinoma, Grade 1, at the left uterine horn ($\times 120$).



Fig. 4.—Gross specimen of the uterus from Case 2 showing a carcinomatous involvement of almost the entire uterus.

might be transmitted by way of the umbilical vein more frequently than is suspected. Cases have been described in which bacilli were found in the fetus in the absence of visible lesions and the same holds true for the placenta. The writers in this study investigated the possibility of detecting tubercle bacilli in the cord blood. In 15 cases studied in this respect one positive culture was obtained. The placenta in this case had a necrotic tuberculous area showing caseous masses in the placental sinuses. The infant was born prematurely in the seventh month, weighing 1100 gr., dying three hours after birth. No evidence of tuberculosis could be discovered in any of the various fetal tissues examined microscopically.

HUGO EHRENFEST.

Mahon, R.: *The Obstetrical Prognosis of Large Uterine Fibroids*, Rev. franç. de gynéc. et d'obstét. 29: 1041, 1934.

According to Mahon the prognosis of large uterine fibroids from the obstetric point of view is not unfavorable for the mother or the child. Hence there is no justification for prophylactic interference. The physician should not interfere but he should be prepared for action when this becomes necessary. There is no parallelism between the size of the fibroid and the complications which may arise during pregnancy or labor. A diagnosis of necrobiosis of a fibroid during pregnancy is not an indication for intervention. Many women who have necrobiosis of uterine fibroids during pregnancy go through their pregnancy and the puerperium without symptoms. Most symptoms which arise as the result of this complication yield readily to rest in bed and an icebag. However, when septic necrosis occurs, an immediate hysterectomy should be performed. When a fibroid is found blocking the exit of a fetus, nothing should be done until the end of pregnancy. The amount of dystocia of a fibroid should not be judged until the patient has had a test of labor. Exceptionally, surgical intervention in the form of a cesarean section may be necessary. This should usually be followed by a hysterectomy. Occasionally, however, one may perform a cervical cesarean section followed by a myomectomy. If symptoms of infection arise during the puerperium, it is best to perform a hysterectomy. In summary it may be said that a physician should conduct himself as an obstetrician during pregnancy and as a surgeon during labor and the puerperium.

J. P. GREENHILL.

Lantuejoul, P.: *Nine Myomectomies During the Course of Pregnancy and the Puerperium*, Bull. Soc. d'obst. et de gynéc. de Paris 24: 275, 1935.

During the last fifteen months, 12 women were operated upon for fibroids of the uterus during pregnancy and the puerperium in Brindeau's clinic. Three of these women had hysterectomies whereas the remaining 9 had only myomectomies. Four of the myomectomies were performed during labor after extraction of the child by cesarean section. Two myomectomies were performed after labor, one through the vagina and the other by the abdominal route. Three patients had myomectomies during pregnancy before term.

The author emphasizes that myomectomies in general are simple to perform and have a good prognosis. Of the 3 women operated upon during pregnancy, only one aborted. This operation was performed at the fifth month and the fibroid which was removed weighed 11 pounds. There was one case of embolism in this series, in a patient who not only had a large fibroid but also placenta previa and a serious hemorrhage.

J. P. GREENHILL.

Examination at the clinic revealed that she was a thin, anemic-appearing woman, who weighed 93 pounds (42.2 kg.). The significant findings relative to her symptoms were a large, irregular, and retroverted uterus; an enlarged cervix, which bled easily; and a mild secondary anemia.

The uterus was explored through a low midline incision. A firm lesion was palpated in the cervix, which felt like a cervical fibroid. There apparently was no induration of the broad ligament or involvement of the lymph nodes. A total abdominal hysterectomy, with bilateral salpingo-oophorectomy was performed. Her convalescence was somewhat prolonged by a bronchopneumonia which developed on the basis of a preexisting bronchiectasis of long standing. She was dismissed from the hospital in good condition.

A malignant mass, which measured 11 by 9 by 4 cm., was found (Figs. 4, 5, and 6). This involved practically the whole uterus, including the internal os of the cervix and the paracervical tissue. In the body of the uterus, the mass was an adenocarcinoma, Grade 2, while in the cervix it was an adenocarcinoma, Grade 3. Bilateral chronic cystic oophoritis and chronic salpingitis were found.

COMMENT

There can be no doubt of the double origin of the tumors in Case 1, as one was derived from the squamous epithelium and the other from the uterine glands. In Case 2, both tumors were derived from the uterine glands and were grossly indistinguishable. However, the distinct difference in the amount of differentiation of the cells between two regions of the tumors in the uterus leads us to believe that there is reason for designating them as two different malignant processes.

REFERENCES

- (1) Billroth, C. A. T.: Quoted by Warren and Gates. (2) Brandt, M., and Jakobson, K.: *Ztschr. f. Krebsforsch.* 32: 280, 1930. (3) Hanlon, F. R.: *Am. J. Cancer suppl.* 15: 2001, 1931. (4) Hurt, H. H., and Broders, A. C.: *J. Lab. & Clin. Med.* 18: 765, 1933. (5) Junghans, Herbert: *Ztschr. f. Krebsforsch.* 29: 623, 1929. (6) Major, R. H.: *Bull. Johns Hopkins Hosp.* 29: 223, 1918. (7) Rappin: Quoted by Warren and Gates. (8) Schreiner, B. F., and Wehr, W. H.: *Am. J. Cancer* 20: 418, 1934. (9) Ward, Roy: *Brit. M. J.* 2: 511, 1930. (10) Warren, Shields, and Gates, Olive: *Am. J. Cancer* 16: 1358, 1932.

Walther, Otto: *Lymphosarcomatosis of the Female Genitalia*, *Arch. f. Gynäk.* 157: 44, 1934.

Walther describes two cases of lymphosarcomatosis of the female genitalia which he studied and adds four from the literature. The growth started in the uterus in five and in the ovaries in the sixth case. Five tumors showed average maturity, the cells resembling lymphoblasts and lymphocytes. These tumors spread by infiltration into the surrounding structures followed by lymphogenic metastases to the retroperitoneal lymph nodes and finally to distant lymph nodes. Finally there was a hematogenous metastasis together with implantation growths. No leucemic changes were found in the spleen, marrow, liver or blood, thus ruling out systemic leucemias. These tumors all originated in preexisting lymphatic tissue.

The clinical picture of lymphosarcomatosis is similar to that of a carcinomatosis, except that the process is more malignant, more rapid, and results in death earlier. These tumors occur in women between the ages of forty-five and sixty-five years.

RALPH A. REIS.

fetuses, early interruption of pregnancy, uterine atony, disturbances in involution, etc. During the disease the fetuses are hampered in their development. Many fetuses are born dead and those that are born alive are small and weak.

J. P. GREENHILL.

Fraymann, S. A.: Myelitis Complicating Pregnancy and Labor, *Monatschr. f. Geburtsh. u. Gynäk.* 99: 210, 1935.

Myelitis becomes a complication of pregnancy and labor not because it represents an infection but because it produces a toxemia and results in hemorrhage into the gray and white substance of the spinal cord. Likewise it results in degenerated changes which are the result of a toxemia. If myelitis occurs during the first half of pregnancy, the latter should be terminated. However, if it occurs in the second half of gestation the pregnancy may be permitted to continue to term. The treatment of myelitis during pregnancy is the same as it is for pregnancy toxemias, namely, abundant venesection, removal of cerebral spinal fluid, and hunger. The author suggests that a better term for myelitis is "Myelopathia gravidarum toxica haemorrhagica."

J. P. GREENHILL.

Kolbe, L., and Szekacs, A.: The Value of the Flocculation Reactions for the Demonstrations of Syphilis During Pregnancy, *Arch. f. Gynäk.* 157: 214, 1934.

The authors believe, as a result of their studies, that the Kiss reaction as well as the Kahn test are well suited for the determination of the presence of syphilis in pregnant or puerperal women. Both tests will disclose latent syphilis more frequently than will the Wassermann reaction. This latter test, however, is more specific even though it is less sensitive. The technic of the Kiss test is as simple as that for the Kahn test and both tests can be completed in a short time. Both may serve as controls for the Wassermann test but may also be used alone, especially if a careful history is obtained, and if the patient is carefully observed for signs and symptoms. The authors feel that these tests should be repeated in the puerperium.

RALPH A. REIS.

Spiegler, R., and Hartung, W.: Gonorrhea and Pregnancy, *Monatschr. f. Geburtsh. u. Gynäk.* 99: 41, 1935.

Among 17,578 labor cases in Seitz's clinic, Spiegler and Hartung found gonorrhea during labor in 260 women, an incidence of 1.48 per cent. In addition, 280 women or 1.59 per cent had previously had gonorrhea but had no signs of it during labor. More than two-thirds of these women were unmarried and were primiparas. The puerperium was completely normal in only 50.8 per cent of the positive cases and in only 57.9 per cent of the previously treated patients. However, only about half of the puerperal complications in these cases could be attributed to the presence of gonorrhea. Actual ascension of the gonorrheal infection occurred in 18.8 per cent of the positive cases and in 7.4 per cent of the previously treated patients. A gonorrheal conjunctivitis occurred in 3.8 per cent of the newborn and a nonspecific conjunctivitis was observed in 8.8 per cent. It was interesting to find that 9.8 per cent of the women who had active gonorrhea conceived again and gave birth to children. Among the treated patients, 56.8 per cent conceived for the first time after they acquired their gonorrheal infection. Of the total of 540 patients, 213 or 39.4 per cent became pregnant again after they were infected. Furthermore 17 of these women conceived after they had had definite inflammation of the tubes.

J. P. GREENHILL.

injection of the hormone on trial. Two commercial preparations of pregnancy urine hormone were used; antuitrin-S and follutein.*

Synopses of eleven trials in 4 patients follow:

CASE 1.—(No. 21283.) Patient aged twenty-eight, had had amenorrhea since the birth of a child two and one-half years before admission to the clinic on Oct. 14, 1932. Basal metabolism rate -6 per cent. October 17 to May 5, dried thyroid (Armour) gr. ii to v, each day. October 17 to January 23, antuitrin-S, 27×100 rat units. Feb. 3, 1933, biopsy: Atrophic endometrium. March 24, biopsy: atrophic endometrium.

Exper. 1.—May 5 to May 15, follutein, 5×500 rat units. May 12, biopsy: atrophic endometrium. May 26, biopsy: atrophic endometrium. June 2, biopsy: atrophic endometrium.

Exper. 2.—June 5 to June 16, follutein, 6×500 rat units. June 16, biopsy: very early proliferative phase. June 23, biopsy: very early proliferative phase. June 30, biopsy: very early proliferative phase.

Exper. 3.—June 30 to July 7, follutein, 4×500 rat units. July 7, biopsy: very early proliferative phase. July 10 to July 21, follutein 3×500 rat units. July 21, biopsy: atrophic endometrium. There was no staining at any time.

No sign of secretion was found in the endometrium after any treatment with pregnancy urine extract, which must have failed, therefore, to cause corpus luteum formation; furthermore, although it is only doubtful that the extract completely failed to stimulate even the follicles, it is clear that if it did at all they were not made to develop far enough to cause more than a very slight effect on the endometrium.

With this patient, after no series of treatments with pregnancy urine extract was there any sign of any bleeding. That these failures to stimulate the endometrium beyond the earliest proliferative phase were not due to an insensitivity or absent receptor quality on the part of the endometrium was clearly demonstrated by further experiments already reported.² In these this patient was twice given $5 \times 10,000$ rat units of progynon-B (Schering). After each series of 5 injections the endometrium was found to have developed to the ten-day type of proliferation. Ten days after the first series there occurred vaginal bleeding that lasted four days, and eight days after the second series again, bleeding occurred, requiring two napkins daily, for a few days. A third series of $5 \times 10,000$ rat units of progynon-B was given and followed by 5×10 rabbit units of proluton (Schering's preparation of progestin). After this a secreting endometrium was found and menstruation lasting three days followed on the day after the last dose of proluton.

CASE 2.—(No. 21258.) Patient was twenty-three years of age. Her periods had always been regular until marriage six years before admission to the clinic in January, 1933. For four years after she was married she experienced a steadily diminishing flow that stopped altogether two years before admission. She had gained 50 pounds in the first six months following marriage. Jan. 27, 1933, biopsy: atrophic endometrium. Jan. 28 to March 5, theclol 18,500 rat units. March 3, biopsy: dysplastic eight- to ten-day proliferating endometrium. March 5, catamenia, five days, two napkins a day.

Exper. 4.—March 20 to April 4, antuitrin-S, 5×500 rat units. April 7, biopsy: atrophic endometrium. April 9, catamenia, five days, two napkins per day.

Exper. 5.—April 28 to May 3, antuitrin-S, 2×500 rat units. May 5, biopsy: fourteen-day proliferating endometrium. May 6, catamenia, two days, two pads a

*Parke, Davis & Co. generously supplied the antuitrin-S, and E. R. Squibb & Sons the follutein used.

MALADIES DES FEMMES ENCEINTES. Par Henri Vignes. I. Affections du tube digestif, 318 pages avec 34 figures. II. Affections du foie, pancreas; maladies de la nutrition, parois abdominales, peritoine, 206 pages. Masson et Cie, editeurs, Paris, 1935.

THE CERVIX UTERI, with special reference to the development of cancer. By R. Francis Matters, Lecturer in Human Physiology and Pharmacology, University of Adelaide, etc. Illustrated, 197 pages. The Hassell Press, Adelaide, 1935.

Item

American Board of Obstetrics and Gynecology

The oral, clinical and pathological examination of candidates for certification by this Board will be held in Kansas City, Missouri, on Monday, May 11, and Tuesday, May 12, 1936, immediately prior to the scientific session of the American Medical Association.

The annual informal dinner and general conference of Diplomates attending the American Medical Association convention will be held at the Hotel Kansas Citian, Kansas City, on Wednesday, May 13, at 7:00 P.M. At this dinner the successful candidates from the examinations of the two preceding days will be presented in person, and short addresses will be made by two members of the Board and two invited guests.

For further information, booklets, and application blanks, apply to the Secretary, Dr. Paul Titus, 1015 Highland Building, Pittsburgh (6), Pennsylvania.

C. Jeff Miller

We regret to announce the death on March 20 of Dr. C. Jeff Miller, of New Orleans, a member of the Advisory Editorial Board of the JOURNAL from the time of its founding and a valued contributor to its pages. A more extended memorial will appear in the May issue.

Exper. 9.—October 13 to October 25, theelin, 6×500 rat units. October 27 to November 8, follutein, 6×500 rat units. November 17, biopsy: twenty-one-day mid-secretory endometrium. Following this there was no catamenia. December 4, biopsy: resting endometrium. February 18, 1934, stained one drop. April 20, biopsy: resting endometrium.

Exper. 10.—April 23 to May 2, progynon, 5×500 rat units. May 4, biopsy: twelve-day proliferating endometrium. May 4 to May 14, follutein, 5×500 rat units. May 16, biopsy: early proliferating phase. May 25 to June 8, progynon, $6 \times 10,000$ rat units. June 8, biopsy: eight- to ten-day proliferating phase. June 11, slight staining. June 11 to June 15, proluton, 5×1 rabbit unit. June 15, biopsy: atrophied endometrium. August 28, biopsy: atrophied endometrium.

Here again in two instances, on March 24 and May 5, 1933, we fail to find evidence in the endometrium of any appreciable effect on the ovary after antuitrin-S. The following month, June 2, after 6×500 rat units of antuitrin-S, we do find a six-day proliferation. No flowing supervenes, however, yet the week following, the endometrium is again found at a much earlier stage, similar to that commonly called atrophy. Perhaps here on June 2 we have a suggestion of stimulation, discounting the effect of biopsy instrumentation.

The experiment which followed, ending with a biopsy on Nov. 17, 1933, is very interesting. A twenty-one-day secreting endometrium is found after theelin followed by follutein. No flow follows, yet biopsy two weeks later shows regression to an atrophied or very early proliferating phase. Is this a single instance of corpus luteum formation by pregnancy urine hormone in 11 trials on these 4 patients? It is suggestive that in the same patient, Experiments 6, 7, and 8 all failed to produce any sign of corpus luteum formation. Experiment 9 differs from them in that follutein was used instead of antuitrin-S. These two products are generally considered by biologists as preparations of the same hormone, and to have similar effects in equal dosage. Experiment 9 also differed from the others in that this time the pregnancy urine extract was preceded by theelin. There is no experimental evidence nor is it theoretically likely that estrin sensitizes the follicle to the pregnancy urine hormone. In Experiment 10, progynon, an estrogenic preparation not biologically dissimilar from theelin, and closely related chemically, failed to do so, at least up to twelve days after the first dose and two days after the last dose of follutein.

The failure to flow during such a marked regression of the endometrium is a very unusual observation. Perhaps it occurs oftener than is suspected. We know that patients who customarily each month flow only for half an hour, barely staining one napkin, menstruate thus meagerly from a fully developed twenty-eight-day predeciduum, which in spite of the scant blood loss regresses to the normal early proliferating endometrium characteristic of the first six days of the cycle. The patient of the experiment may be but one stage down in the scale of bleeding. Nor is this failure to menstruate while the endometrium regresses from a full secretory to an early proliferating phase unthinkable. Except for the primates, it is the common occurrence in all other mammals in whom pseudopregnancy develops a deciduum which in time regresses without bleeding. Possibly such is the case in those patients with amenorrhea who become pregnant; and the explanation is not that they would have had a period two weeks after conception had they failed to become pregnant.



C. JEFF MILLER
1874-1936

CASE 4.—(No. 21526.) Patient, aged thirty-three, had had her last real period a year before admission to the clinic on March 16, 1933, although she had a little staining four months before.

Exper. 11.—March 16 to March 29, 1933, antuitrin-S, 3×500 rat units and follutein, 2×500 rat units. April 7, biopsy: resting endometrium. April 14, biopsy: resting endometrium. April 21, biopsy: resting endometrium.

Here once more we fail to obtain evidence of any good stimulation of the follicular apparatus by pregnancy urine extract, assuming that such follicular activity would cause changes in the endometrium characteristic of estrin and progestin.

SUMMARY

An attempt was made to detect in human beings an ovary-stimulating effect in anterior pituitary-like, pregnancy urine extract. To four married women, aged twenty-three, twenty-seven, twenty-eight, and thirty-three, with amenorrhea for one to two and one-half years, were given total doses of either antuitrin-S or follutein, varying in stated potency from 1,500 R. U. to 3,500 R. U. The individual dose was 500 R. U. given intramuscularly on alternate days (Table I). Biopsies of the endometrium were made sometimes before, sometimes during, and in each case after treatment. In only two instances was there any change in the endometrium which would suggest increased ovarian function. In only one case (*Exper. 9*) was the treatment followed by the appearance of a progestin-stimulated endometrium. There is some question, in even this one case, that the ovary was actually stimulated by the injections, as a repetition of the experiment failed to give a similar result. Three other experiments with this same patient were negative. In only two cases was there any flow following the treatment, and in one of them it was from an atrophic endometrium, in a patient whose flowing mechanism seemed very unstable during treatment with various hormones. (Case 2.)

CONCLUSION

From moderate doses of pregnancy urine extract, no ovary-stimulating effect can be detected in the endometrium of the human female with amenorrhea. Johnson⁴ has likewise been unable to detect any such effect from pregnancy urine extract in monkeys, though much larger doses were given.

REFERENCES

- (1) Any circular advertising such products. (2) *Rock, John*: N. E. J. Med. 210: 25, 1934. (3) *Werner, A. A., and Collier, W. D.*: J. A. M. A. 100: 663, 1933. (4) *Johnson, C. E.*: AM. J. OBST. & GYNEC. 29: 120, 1935.

In 1906 he was made President of the Orleans Parish Medical Society. His professional attainments were further recognized by the New Orleans Polyclinic and his appointment as Professor of Gynecology and Obstetrics in the Postgraduate Department of Tulane University. Early in his career he was associated with the old Presbyterian Hospital, since demolished, and later he became Chief of the Gynecological Service at Touro Infirmary, and head of an active service in Charity Hospital.

It was in these several institutions that he developed a careful, life-saving technique, and cultivated his natural teaching gift, which was eventually to find its full fruition when he was given the Professorship of Gynecology in Tulane Medical School. Already he had proved himself, both as a Surgeon and as a Teacher, the exceptional man, a prophet in his own country.

New Orleans, the city of his adoption, very early recognized in him not only the able physician, but also the qualities of a public-spirited, trustworthy citizen. He was made Chairman of the Annual Community Chest; the arrangement of no Carnival was complete without him; he was President of the Board of Trustees of the Howard Memorial Library, and for many years a Member of the Board of Control of the Leper Home of Louisiana. Recently he was the Campaign-Chairman for the erection of the Flint-Gooderich Hospital, in affiliation with Dillard University; a large scheme for the education and care of colored people.

These were but a few of his manifold activities, exercised as they were in the very midst of a strenuous professional life.

Is it any wonder that his city was proud of him?

Becoming eminent in this way at home, it was only natural that his influence should extend further afield, bearing the name and the fame of this Louisiana surgeon.

He was chosen as one of the founders of the American College of Surgeons, sat on its Board of Regents, and finally in 1930-31 became its President. In 1916 he was elected a Fellow of the American Gynecological Society, later served on its Council and was appointed its President in 1928-29; the following year he was President of the American Gynecological Club. Already he had acted as Chairman of the section of Obstetrics, Gynecology and Abdominal Surgery for the American Medical Association and also as President of the Southern Surgical Association. During the Great War he served as a Major in the U. S. Army Medical Corps. He became known in Europe as a Corresponding and Honorary Member of several of their specialist societies. At the time of his death he was President-elect of the South-Eastern Surgical Congress, meeting in his own city a few weeks ago.

It was indeed a full life, and full to the very end, for the above is but a mere sketch of his multiform activities, and gives no account whatever of the scrupulous attention to detail and the warmth of personal color with which he completed the picture.

in the series if her pregnancy was known to be complicated by any pathologic condition. Each new patient, after being interviewed by the financial clerk and accepted for hospital delivery, was referred to a special technician for a hemoglobin and red blood cell count. In this study a hemoglobinometer of the Sahli type was used. The instrument was checked at the start, and on several subsequent occasions, against another Sahli apparatus on which gas analysis standardization had just been performed. Double counts were taken on each patient and the average of the two was accepted as being correct. All the blood pipettes were new and were of the same standard. All the work was done by one special technician.

It may be stressed that in order to have blood work of this kind reliably performed it is absolutely essential to have a special technician in attendance at the Clinic. Little or no reliance can be placed upon red blood cell counts, or more

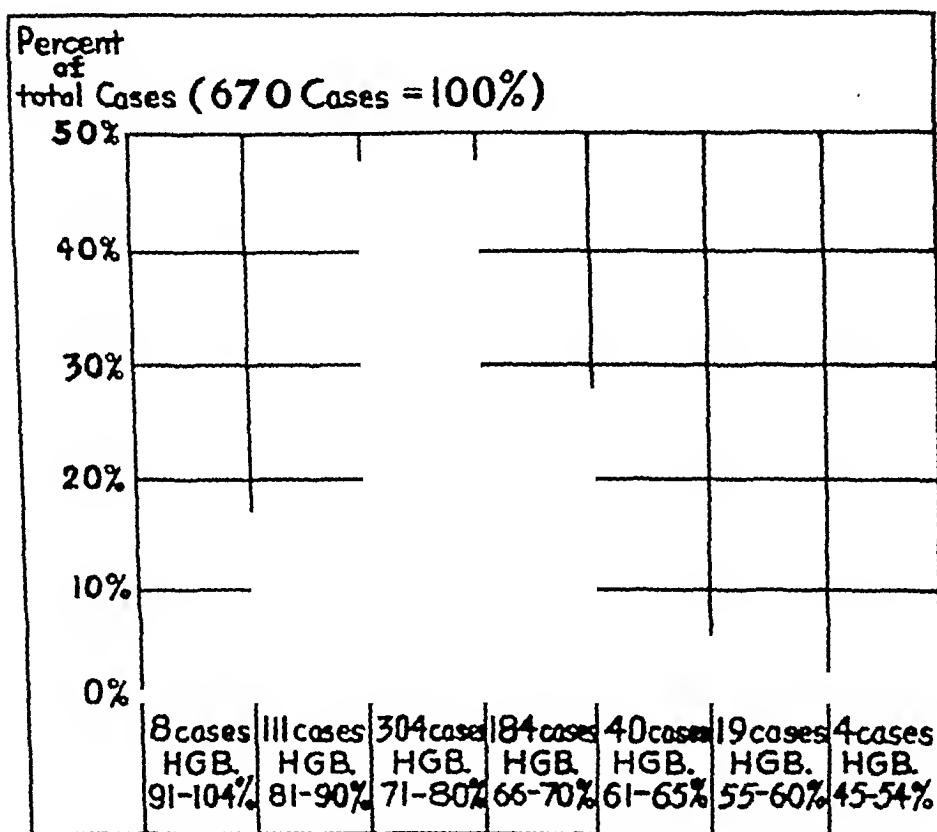


Fig. 1.—Hemoglobin estimation in a group of 670 pregnant women.

particularly upon hemoglobin readings, when they are done by constantly changing personnel, with unstandardized apparatus, in the hurry and bustle of large prenatal clinics.

All new maternity patients reporting to the Clinic had blood examinations done as described. All patients who had a hemoglobin of 65 per cent or less were regarded as needing treatment, unless they were four weeks or less from term. If treatment was needed, the patient was given either (a) iron and ammonium citrate, 25 per cent solution, and instructed to take two teaspoonfuls three times a day (total dosage 90 gr. a day), or (b) 3 gr. of ferrous sulphate tablets* four times

*The 3 gr. ferrous sulphate tablets used in this series were obtained through the courtesy of Smith, Kline and French Laboratories, Philadelphia, Pa.

Original Communications

G BLOOD CHEMISTRY AND RENAL FUNCTION IN ABRUPTIO PLACENTAE*

WILLIAM J. DIECKMANN, S.B., M.D., CHICAGO, ILL.

(From the Department of Obstetrics and Gynecology, the University of Chicago, and the Chicago Lying-In Hospital)

ALTHOUGH numerous obstetricians have reported the etiology, pathology, and treatment of abruptio placentae, no study of the blood chemistry and renal function has yet been published. The data which we have collected demonstrate the importance of vascular disease as the etiologic agent in many cases. They offer an explanation for some of the various phenomena, which will be described later, based on changes in the blood chemistry instead of a circulating "toxin."

The incidence of abruptio placentae varies from less than 0.5 per cent in some hospitals to 2.4 per cent in Edinburgh and 3.65 per cent in Manchester, England. There is a similar variation in the mortality rate which ranges from 3 per cent in most cities to 25 per cent in Shanghai, China.

A review of the literature, especially of the histories of patients who died, indicates that there was a tendency to bleed, and death was due to the persistent hemorrhage from the uterus.

DeLee, in 1901, made note of the hemophilic-like nature of some of these cases and stated that the blood failed to clot in two cases. Williams reported one case with bleeding from the uterus for twelve hours after delivery and from the nature of the pathologic lesions believed it was due to a toxin similar to that found in the venom of the viperine snakes. Davis and McGee reported that in ten of the twelve fatalities in their series, death was due to continued bleeding from the uterus which could not be controlled by a pack or by clamping the uterine arteries in two cases.

Other authors have reported bleeding from abrasions of the vagina, from an abdominal incision, epistaxis, bleeding from the gums and subcutaneous ecchymosis, and have noted hemorrhages beneath the nails of the fingers and toes. I have seen two patients, in one of whom there was bleeding from the gums, the stomach, uterus, and into the subcutaneous tissues. In this patient blood failed to clot in the test tube. The other patient continued to bleed from the uterus, necessitating a hysterectomy. Both recovered.

*Read at the Seventh Annual Meeting of the Central Association of Obstetricians and Gynecologists, held at Omaha, Neb., October 16 to 12, 1935.

NOTE: The Editor accepts no responsibility for the views and statements of authors as published in their "Original Communications."

degree to be included in this series. This left only 26 patients who were available for study. Of these, approximately 63 per cent had hemoglobins ranging between 65 per cent and 60 per cent. Of the remaining 37 per cent, only four patients had hemoglobins lower than 55 per cent, 48 per cent being the lowest figure recorded in the entire group. No anemias of primary type were observed.

In the twenty-six patients who cooperated, and even in this group one is far from certain of 100 per cent cooperation, eight were given iron and ammonium citrate, twelve were given the ferrous sulphate tablets, and six were used as controls. The results are shown in Fig. 2. The graphs cover the entire period of study, but it may be remarked that after the fifth week of treatment, the averages are much less significant, since the number of patients reporting decreased steadily due to delivery intervening.

It will be observed that the red blood cell count closely paralleled the hemoglobin readings. There was a moderate but clear-cut response to medication in hemoglobin and red blood cell regeneration in the patients treated with iron and ammonium citrate, and ferrous sulphate. While the actual figures show a somewhat greater hemoglobin rise by the fifth week for the patients receiving iron and ammonium citrate, the increase in red blood cell count during the same period was greater with those treated with the ferrous sulphate. There seems to be no significant difference in the results of the two forms of iron therapy. The control group showed no significant increase either in hemoglobin or in red blood cell regeneration. Complaints as to diarrhea, gastric upset, and abdominal cramps were not serious with either form of medication. The patients showed a preference for ferrous sulphate because it did not "taste bitter."

SUMMARY AND CONCLUSIONS

1. Anemia of primary type does not occur frequently enough in pregnancy to constitute a real hazard to maternal health, no cases being observed in a series of 670 pregnant women.

2. Grave secondary anemia is relatively infrequent in pregnancy, only 4 patients with hemoglobin readings of under 55 per cent occurring in our series.

3. Although all anemic cases were offered iron therapy free of charge, and encouraged to be faithful in taking the medication, less than half (42 per cent) showed sufficient cooperation to render treatment effective.

4. There was a clear-cut rise in hemoglobin and red blood cell count in the patients who reported having taken iron therapy regularly.

5. In the control group there was no significant rise in red blood cell count or hemoglobin.

6. Ferrous sulphate in one-eighth the dosage is equally as effective as iron and ammonium citrate, in the treatment of secondary anemia in pregnancy. Adequate dosage for ferrous sulphate is considerably cheaper and more convenient for the patient.

7. In general we feel that routine blood cell count and hemoglobin estimations on all ward prenatal patients, as an integral part of the initial physical examination, are hardly worth the time and expense involved, and such studies should be reserved for cases whose clinical pictures warrant it.

particularly, the pathologic examination of the kidneys, these patients do not have an acute or chronic glomerulonephritis, but a primary or essential hypertension.

We have been collecting statistics from various parts of the world on the incidence and mortality of the toxemias of pregnancy and abruptio placentae. There is some parallelism between the occurrence of the two conditions.

It is obvious clinically that there are two very definite types of abruptio placentae. (1) The separation of a normally implanted placenta at or near the end of the second stage or a placenta which overlaps the lower uterine segment and separates as the latter is lengthened by labor. (2) A separation occurring before or very early in labor, associated with vascular disease. In both types the normal degenerative changes in the vessel walls of the uterus are important factors.

Evidence of toxemia constitutes a systolic blood pressure of 140 mm. Hg or more, occurring on two or more days before labor or within the first ten days after delivery. Many of the patients were first seen in shock, but hypertension usually developed during the puerperium. However, with this criterium, we have undoubtedly included several toxemic patients in the nontoxemic group.

We have been able to study 58 cases of abruptio placentae. Forty-five of these cases occurred in the last four and one-half years during the delivery of 11,922 patients, an incidence of 0.37 per cent. Forty, or 69 per cent, of the 58 cases were toxemic, according to our criteria. This group is designated as "A" and the nontoxemic group of 18 cases as "B."

We have usually associated a Couvelaire type of uterus with the toxemic type, but while 11 were found in this group five were also found in Group B. The onset of symptoms in both groups occurred before labor in two-thirds of the cases. In Group A, 18, or 45 per cent, occurred between twenty-six and thirty-three weeks of gestation, and in Group B, 4, or 22 per cent. There were 70 per cent of Group A and 55 per cent of Group B between twenty-six and thirty-seven weeks of gestation.

The number of stillbirths and neonatal deaths was 28, or 70 per cent, in Group A, and 8, or 44 per cent, in Group B.

Weights for the infants were available in 28 cases in Group A, and 12, or 43 per cent, weighed less than 2,000 gm. In 16 cases in Group B, 2, or 13 per cent, weighed less than 2,000 gm. The fetuses in the toxemic group are below the normal weight for the period of pregnancy probably because the normal degenerative processes, plus the vascular disease, decrease the caliber or even obliterate some of the uterine vessels, resulting in either event in a decreased blood flow through the placental sinuses. Even if the pregnancy in these patients with primary hypertension continues to term, the babies are usually small.

THE RÔLE OF THE AMNIOTIC SAC IN LABOR*

LOREN C. SPADEMAN, B.S., M.D., F.A.C.S., DETROIT, MICH.

(From the Department of Obstetrics and Gynecology, Harper Hospital)

WITHIN the past two years there have been increasingly numerous references to the efficacy of artificial rupture of membranes for the induction of labor. Furthermore, statements have been made that this method is not only effective, but harmless, both as regards the mother and the child. That the effect upon the duration of labor is to shorten it, is the consensus of opinion among recent writers on the subject.

Margaret Schultze,¹ in a study of 600 cases of spontaneous premature rupture of membranes, found primiparous labors to average 12.1 hours, and multiparous labors to average 7.1 hours. She also found that in two-thirds of the operative deliveries for dystocia, there were one or more causes for the dystocia aside from dry labor. A maternal morbidity of 17 per cent occurred in her series, the standard used being an elevation of postpartum temperature to 100.4° on one or more occasions. Norris² reported a maternal morbidity of 20 per cent in his series of premature rupture of membranes. In Morton's³ series the average duration of labor was 9.6 hours for primiparas and 3.9 hours for multiparas. Mason⁴ reported 9.5 hours for primiparas and 6.9 hours for multiparas and stated that the proportion of long labors in cases of premature rupture of membranes is less than in cases where the membranes remain intact until the cervix is fully dilated. Fitzgibbon⁵ has stated that the bag of waters does not play any part in the dilatation of the cervix. A duration of labor of 11.2 hours in primiparas and 7.0 hours in multiparas following premature rupture of membranes was reported by Jackson.⁶ All of these writers, including Guttmacher and Douglas,⁷ agreed that there was no increase in maternal morbidity. The latter authors also reported a decrease in length of labor following artificial rupture of membranes to 10.5 hours for primiparas and 5.4 hours for multiparas. In their series the fetal mortality for term babies was 5.08 per cent, which is about the same as their general fetal mortality at term. Kings⁸ stated that the dystocia credited to dry labor is generally due to other complicating abnormal conditions, premature rupture of the membranes being a result rather than a cause of difficulty in labor.

Because the formerly accepted belief in hazards of dry labor seemed definitely contradicted by the writers quoted above, it was decided to investigate whether or not the fear was justified by our experience. Accordingly, a study was made of one thousand consecutive deliveries at Harper Hospital between January, 1934, and April, 1935. Only normal full-term single pregnancies with vertex presentations were used, there being 478 primiparas and 522 multiparas. The series was divided into two groups, one with spontaneous and the other with artificial rupture of the membranes. The groups numbered 734 and 266 respec-

*Read before the Detroit Obstetrical and Gynecological Society, October 1, 1935.

partum blood pressures are taken as criteria for the patient's normal pressure. This may explain the shocklike state which many of these patients present, but with a systolic pressure of more than 100. It is obvious that a drop in pressure from 200 to 120 is just as serious to the patient, if not more so, as a drop in a normal individual from 120 to 60. In Group B a number of the blood pressures were definitely in the shock range. The figures for the diastolic pressures show these contrasts even better than those for the systolic. The large number of cases with a diastolic blood pressure over 100 is quite marked in Group A.

In Table II are listed the figures for hemoglobin. The determination on admission is not an exact index of the patient's hemoglobin because following hemorrhage there is first a blood concentration and later a dilution. The subnormal hemoglobin after delivery, despite massive transfusions, indicates better the marked anemia which must have been present. In those patients who were transfused, the average amount of blood per patient was 1,183 c.c. The patients in Group B on admission had a lower hemoglobin than those in Group A. This may be due to a fact which we have noted, that pregnant patients with vascular disease have a higher hemoglobin than that characteristic of normal pregnancy.

TABLE II. HEMOGLOBIN, GRAMS PER 100 C.C. OF BLOOD

RANGE	TOXEMIC			NONTOXEMIC	
	ADMISSION	POSTPARTUM 1-10 DAYS	3 MONTHS	ADMISSION	POSTPARTUM 1-10 DAYS
5- 6.9				3	2
7- 8.9	2	8	1	3	5
9-10.9	5	7	1	1	3
11-12.9	3	11	3	1	5
13-14.9	1		10		2
Average	10.6	11.1	13.0	8.0	10.0

In Table III are listed the cell volume determinations. The findings are similar to those for the hemoglobin. We wish again to call attention to the determination of the cell volume because of its accuracy and ease of determination.

TABLE III. CELL VOLUME, PER CENT

RANGE	TOXEMIC			NONTOXEMIC	
	ADMISSION	POSTPARTUM 1-10 DAYS	3 MONTHS	ADMISSION	POSTPARTUM 1-10 DAYS
20-24		1		4	3
25-29	3	9	1	1	6
30-34	3	5		1	3
35-39	3	6	4	2	6
40-44	2	3	5		2
45-49			7		
Average	33.8	32.2	42	27.6	31.5

In Table IV are listed the concentration of serum protein for both groups. The number of determinations for each group was small. They showed no significant

TABLE IV. SERUM PROTEIN, GRAMS PER CENT, BOTH GROUPS

RANGE %	ADMISSION	POSTPARTUM		
		1-2 DAYS	3-9 DAYS	3 MONTHS
4-4.9	1	1		
5-5.9	5	6	1	
6-6.9	6	3	6	5
7-7.9	3		6	11
8-8.9			3	1
Average	6.5	5.6	7.1	7.2

In Table II is given the incidence of temperature elevation for the several groups. Attention is again directed to the fact that these figures represent all puerperia with temperature elevation of 100.4° and over one or more times and is a more exacting standard than that

TABLE II. EFFECT OF RUPTURE OF MEMBRANES ON POSTPARTUM TEMPERATURE ELEVATION

A. Spontaneous rupture	Primiparas	1 in 4.7	21%
	Multiparas	1 in 8.2	12%
B. Artificial rupture	Primiparas	1 in 4.1	24%
	Multiparas	1 in 10.7	9%

of the American College of Surgeons. It is evident that the incidence of temperature elevation in primiparas is approximately twice that in multiparas, and that the incidence where the membranes have been ruptured artificially is about the same as in those with spontaneously ruptured membranes. This confirms the opinions of previous investigators that artificial rupture of the membranes does not increase maternal morbidity. The higher proportion of temperature elevations in primiparas may be due to the higher incidence of operative delivery.

TABLE III. EFFECT OF RUPTURE OF MEMBRANES ON OPERATIVE DELIVERY

		NO. OPER. DEL.	INCIDENCE	PERCENTAGE
A. Primiparas	Spontaneous rupture	204	1 in 1.7	56
	Artificial rupture	73	1 in 1.5	63
B. Multiparas	Spontaneous rupture	71	1 in 5.2	19
	Artificial rupture	32	1 in 4.7	21

The figures in Table III indicate that there is a slight increase in the incidence of operative delivery in cases where the membranes were ruptured artificially, but because of the relatively small number, it is not believed that this increase is sufficient to be particularly significant. Table IV shows that the preponderating form of operative delivery is by low forceps.

TABLE IV. TYPES AND NUMBER OF OPERATIVE DELIVERIES

		LOW F.	MID F.	V. & E.
A. Primiparas	Spontaneous rupture	183	15	8
	Artificial rupture	57	4	12
B. Multiparas	Spontaneous rupture	61	7	3
	Artificial rupture	21	6	5

It will be noted that in artificial rupture of the membranes, both for primiparas and multiparas, the incidence of version and extraction is considerably higher than in spontaneous rupture of the membranes. In a number of instances the membranes were ruptured artificially at the time of version and therefore this was not a causative factor in the indication for intervention. It is probable that these cases account

Plasma cholesterol determinations were made on a number of the cases, but there is no significant difference between the two groups and the normal.

If hemoglobin and hematocrit determinations are made on the patient's blood and on some of the bloody fluid obtained from the vagina, the figures for the latter are usually much less in cases of abruptio placentae, while in placenta previa the figures are almost identical. In cases of abruptio placentae, hemorrhage and coagulation occur in the uterus, with a squeezing out of serum from the clot. Thus the blood in the vagina is diluted with serum.

DISCUSSION

It appears probable that the majority of the cases of abruptio placentae are associated with a vascular disease which is only rarely due to a chronic glomerulonephritis. This hypertension may be caused or intensified by the pregnancy. In some cases the pregnancy apparently stimulates a latent hypertension to become active. The hemorrhage may be internal or concealed, external or revealed, or combined. The first is usually the more serious because the failure of the blood to escape from the uterus is due to the laxity of the uterine wall. This lack of tone of the uterus predisposes to further hemorrhage. Other minor factors are the placental site and the patency of the cervix. Thus blood is more likely to escape if the placenta lies low and the cervix is dilated.

Goodall described the changes in the uterine wall after delivery and stated that the vessels were obliterated by a degenerative process. Schwarz and McNalley confirmed this work and noted further that changes in the intima occurred in pregnancies between twenty-four and thirty-six weeks' duration. They felt that these vessel changes were of importance because in those cases which showed the most marked vessel change there was extensive infarct formation in the placenta. They also suggested that abruptio placentae could very easily occur in patients with hypertension because the degenerative changes, with consequent weakening of the vessel walls, would favor rupture and hemorrhage.

The amount of hemorrhage and the resultant pathology would depend on the size of the ruptured vessel, the site of the rupture, that is, whether it was in the decidua basalis or the uterine wall, and the blood clotting properties of the individual case. While we have no direct evidence, yet reports of cases of suppression of the urine subsequent to marked infarction of the placenta or abruptio placentae would seem to indicate that in some instances these conditions are identical, differing only in degree. For example, if a maternal vessel supplying a portion of the placenta is slowly obliterated, infarction will occur. On the other hand, if the obliteration is marked or if the vein is obliterated before the artery, it is possible for hemorrhage (abruptio placentae) to occur.

length of labor was 12.9 hours and in multiparas 5.9 hours. In artificial rupture of the membranes, the average duration of labor was 13.6 hours in primiparas and 6.3 hours in multiparas, thus it appears that rupture of membranes does not seriously affect length of labor in primiparas or multiparas. Artificial rupture of membranes (either in first stage or second stage) does not result in prolongation of labor, neither does it expedite labor.

2. The effect on postpartum temperature elevation, showing that the incidence of temperature elevation to 100.4° F. on one or more days is no greater following artificial rupture of the membranes than following spontaneous rupture, the average incidence for both being 16 per cent; and that elevated temperatures were noted more frequently following delivery of primiparas than multiparas. The higher incidence of operative delivery (all forms) may account for increased incidence of temperature elevation in primiparas regardless of cause and time of rupture of membranes.

3. The effect on the incidence of operative delivery, showing that in both primiparas and multiparas the incidence of operative delivery is essentially the same regardless of time or cause of rupture of membranes.

4. The effect on the incidence of fetal mortality following artificial rupture of the membranes for induction of labor, showing that it is not increased, the percentage being 1.7 as compared with 1.6 per cent for all cases considered. The findings of this investigation substantiate our clinical impression that textbook figures for length of labor (in primiparas and multiparas) are in need of revision.

REFERENCES

- (1) *Schultze, M.*: AM. J. OBST. & GYNEC. 17: 20, 1929. (2) *Norris*: AM. J. OBST. & GYNEC. 19: 500, 1930. (3) *Morton*: AM. J. OBST. & GYNEC. 26: 323, 1933. (4) *Mason*: AM. J. OBST. & GYNEC. 26: 394, 1933. (5) *Fitzgibbon*: J. Obst. & Gynec., Brit. Emp. 38: 495, 1931. (6) *Jackson*: AM. J. OBST. & GYNEC. 27: 329, 1934. (7) *Guttmacher and Douglas*: AM. J. OBST. & GYNEC. 4: 485, 1931. (8) *King*: AM. J. OBST. & GYNEC. 28: 763, 1934. (9) *Williams*: Obstetrics, ed. 6, New York, 1930, D. Appleton-Century Co.

1457 DAVID WHITNEY BUILDING

Lang, Samuel J.: Backache in Women, Illinois M. J. 68: 147, 1935.

The author states that a common cause of backache in multiparous women is malposition of the pelvis resulting in ligamentous and muscle strain. Complications such as ligamentous hypertrophic arthritis of the small joints, migration of the nucleus pulposus, and horizontal sacrum, follow some uncorrected cases. The treatment stresses rest in bed. Exercises such as clasping the flexed knees against the chest with the purpose of shortening the abdominal muscles and correction of the anteverted position of the pelvis, heat, massage, and correction of abnormal body weight prove effective.

EUGENE S. AUER.

rhage. A vascular spasm due only to hemorrhage will probably not result in thrombosis and necrosis of the kidney tissue, but if the patient has a vascular disease in addition, damage to the kidneys may occur. The fact that in many clinics adequate amounts and proper administration of blood, hypertonic glucose and Ringer's solution have prevented the occurrence of cortical necrosis, and the rarity of anuria now, in contrast to the period previous to the use of hypertonic glucose, warrants this belief.

Since the renal function in the majority of our cases after delivery is more than 50 per cent of the normal, and there is no persistent nitrogen retention and the urinary sediment after delivery is essentially negative, we believe that these patients, even though the hypertension persists, do not have a chronic nephritis but an essential or primary hypertension.

Pregnancy in patients with a primary hypertension or secondary to a chronic glomerulonephritis rarely goes to full term. The placenta, usually early in the last trimester, becomes markedly infarcted with resultant fetal death, or an abruptio placentae occurs, which also usually results in fetal death. A history of abruptio placentae, repeated abor-

TABLE VIII. ABRUPTIO PLACENTAE

Sept. 3, 1933					
3:00 A.M.	Sudden pain in abdomen. Vaginal hemorrhage of 200 c.c.				
5:45 A.M.	Pulse 120. Temperature 36.4. B.P. 100/?. Patient is exsanguinated. Uterus is large, tender, and does not relax. No F.H.T.				
		20% GLU- COSE—C.C. INTRA- VENOUS	BLOOD TRANS- FUSION C.C.	RINGER'S SOLUTION —C.C. HYPODERMO- CLYSIS	
6:40 A.M.	<i>Cesarean section.</i> B.P. 108/?. 700 c.c. blood clot which is equivalent to 2,000 c.c. blood	800	800	2,000	
7:30 A.M.	Air hunger—shock				
11:00 A.M.	Pulse 86. B.P. 130/85.	500	600	1,000	
1:20 P.M.	<i>Subtotal hysterectomy</i> because of persistent hemorrhage from the uterus	200	900	1,000	
6:30 P.M.	Pulse 84. B.P. 145/85. Tem- perature 37. 12-hour total— urine 30 c.c.	1,500	2,300	4,000	
Sept. 4, 1933					
6:00 A.M.	Temperature 38.2. Pulse 96. Respiration 28. Twenty-four-hour to- tal—Urine 1,250 c.c. Intake 9,350 c.c.				
		HEMOGLOBIN GM. %	HEMATOCRIT %	SERUM PROTEIN GM. %	FIBRIN GM. %
Admission	9/ 3/33	6.8	23	--	0.161
	9/ 4/33	7.7	23	5.0	0.440
	10/ 2/33	10.6	36	8.7	
	11/ 9/33	13.0	43		

CASE REPORTS

CASE 1.—A. Di P. (No. 51164). A thirty-four-year-old para v presented herself with a complaint of intense pain of six days' duration in the L.L.Q., radiating to the back and down the inner surface of the left leg. The onset of the pain was sudden and was shortly followed by pallor, rapid pulse, and a feeling of coldness and intense weakness. Three days later the urine became "wine colored." There was no dysuria or urinary frequency. On the following day her skin became jaundiced. Her last menstrual period had occurred three weeks prior to the onset of her symptoms and was atypical in that it lasted only five days instead of the usual seven days. The preceding menstrual period had occurred twenty-nine days earlier and was normal. She came from healthy familial stock, and aside from chronic constipation, she had enjoyed good health prior to her present complaint. Careful inquiry failed to elicit a history of malaria, hemorrhagic diathesis, recent chilling, or of previous jaundice or noteworthy pigmentation of the urine.

Examination showed the patient to be in profound systemic shock. The skin and conjunctivae were moderately jaundiced. Mucous membranes were pale. Blood pressure was 98/60. There was evidence of blood loss, with intraabdominal fluid. Diffuse tenderness was noted in the entire abdomen, particularly in the left lower quadrant. No masses were felt and there was no muscle spasm. No blood was noted in the vagina. The cervix was slightly patulous. The uterus could not be well outlined due to tenderness and obesity, but did not appear to be enlarged. Diffuse fullness but no mass could be felt in the culdesac of Douglas. Palpation of the left adnexal region caused intense pain.

Laboratory Findings.—R.B.C. 2,730,000; Hb. 50 per cent; W.B.C. 11,600, with 82 per cent polymorphonuclear leucocytes. Icteric index 21. Wassermann negative. A catheterized urine specimen was clear but malodorous red in color, specific gravity 1.016; reaction, faintly acid to litmus; albumin trace; sugar 0; acetone 0. The sediment contained a not abnormal number of white blood cells and epithelial cells. Rare red blood cells and no bacteria were found. The urine gave a strongly positive reaction to the guaiac and benzidine tests. Spectroscopically, the absorption bands of hemoglobin were plainly conspicuous.

The diagnosis of ruptured ectopic pregnancy was verified at laparotomy. The peritoneal cavity contained 600 c.c. of fresh and clotted blood. This was removed, and a left salpingo-oophorectomy was performed. The rupture had occurred near the fimbriated end of the tube, and below the site of rupture, early placental tissue was found on microscopic examination. The urine contained grossly recognizable hemoglobin for two days following operation. Spectroscopically, it could, however, still be identified two days longer. At this time the jaundice had disappeared, and blood examination showed icteric index of 5, nonprotein nitrogen 31 mg. per cent. After an uncomplicated twenty-one-day postoperative hospital stay, the patient was discharged in excellent condition. She was seen twice after her discharge from the hospital, and on neither occasion, the last one being five months after operation, did the urine contain demonstrable hemoglobin.

CASE 2.—D. L. (No. 66730). This twenty-one-year-old nullipara was admitted because of pain of three weeks' duration in the right lower abdominal quadrant. The pain began shortly after medical and instrumental attempts were made to bring on an abortion. At that time she had passed an expected menstrual period by two weeks. The preceding menstrual periods had been normal. The onset of pain in the right lower quadrant was accompanied by a brownish vaginal discharge, which became frankly bloody several days later. On the day of admission the patient was seized by intense pain in the right lower quadrant. There was nausea and vomiting. The patient felt dizzy and faint, and was hurried to the hospital.

6. The renal function is impaired in many cases but returns to normal after an interval of several months. These tests demonstrate that a chronic nephritis is not present.

7. The prevention or cure of the associated phenomena is the prompt, adequate, and continued administration of blood and parenteral fluids.

REFERENCES

- Ash, J.: *Am. J. M. Sc.* 185: 71, 1933. Brown, F., and Dodds, G.: *J. Obst. & Gynec. Brit. Emp.* 35: 661, 1928. Davis, M. Edward, and McGee, W. B.: *Surg. Gynec. Obst.* 53: 768, 1931. DeLee, J. B.: *Am. J. Obst.* 44: 785, 1901. Dieckmann, Wm. J.: *AM. J. OBST. & GYNEC.* 26: 343, 1933. *Idem*: *AM. J. OBST. & GYNEC.* 29: 472, 1935. Dieckmann, Wm. J., and Daily, E. F.: *AM. J. OBST. & GYNEC.* 30: 1, 1935. Dieckmann, Wm. J., and Wegner, G.: *Arch. Int. Med.* 53: 188, 353, 1934. Goodall, J.: *Am. J. Obst.* 60: 921, 1909. Kellogg, F.: *AM. J. OBST. & GYNEC.* 15: 357, 1928. McMaster, P., and Drury, D.: *Proc. Soc. Exper. Biol. & Med.* 26: 490, 1929. Mann, F.: *Medicine* 8: 419, 1927. Schwarz, O., and McNalley, F.: *AM. J. OBST. & GYNEC.* 6: 155, 1923. Scriver, W., and Oertel, H.: *J. Path. & Bact.* 33: 1071, 1930. Sheehan, H.: *Personal Communication.* Smith, H., Belt, A., and Whipple, G.: *AM. J. Physiol.* 52: 54, 1920. Whipple, G., and Hurwitz, S.: *J. Exper. Med.* 13: 136, 1911. Williams, J. W.: *J. Obst. & Gynec. Brit. Emp.* 32: 268, 1925. Willson, P.: *Surg. Gynec. Obst.* 34: 57, 1922.

5848 DREXEL AVENUE

DISCUSSION

DR. L. S. MCGOOGAN, OMAHA, NEBRASKA.—Dr. Dieckmann has presented a classification of abruptio placentae which is new at least to me. In the nontoxic group local conditions such as the site of implantation, the character of the endometrial bed, etc., in addition to the local vascular changes which occur normally at the placental site, are the etiologic factors. In the toxic group there are present the above-mentioned vascular changes, but in addition there is generalized vascular change which would tend to the production of infarction or hemorrhage.

As to the etiology of this generalized vascular disease, Dr. Dieckmann has mentioned that previous toxemia of pregnancy is important. He does not mention, however, other conditions in which vascular disease might be present, i.e., syphilis and diabetes. I have personally observed cases of abruptio placentae in both conditions and believe they must have played a most important rôle.

According to Dr. Dieckmann's blood chemistry studies, the vascular disease is not due to a chronic nephritis. I cannot believe that the majority of these cases are due to a primary hypertension. The cause of the pure toxemias, at present unknown, may in these cases be playing an important part, with its greatest expression occurring in vascular phenomena, and clinically expressed as a toxemia.

I am glad that Dr. Dieckmann has emphasized certain clinical findings; first, the presence of shock with the systolic blood pressure reading still above 100 mm. of mercury; and second, the tendency of the patient to bleed from surfaces of the body other than that of the uterus. He has stressed that this purpuric condition is secondary and not primary. In April, 1935, I reported two cases in the *AMERICAN JOURNAL OF OBSTETRICS AND GYNECOLOGY* under the title of "Secondary Purpura Hemorrhagica Complicating Pregnancy." The title really should be changed to "Abruptio Placentae With Purpuric Phenomena."

DR. RUDOLPH W. HOLMES, CHICAGO, ILL.—There are three periods in the history of premature detachment of the placenta when nomenclature led to misinterpretation of the condition. Rigby, about 1770, differentiated the two important antepartum hemorrhages. Placenta previa was designated by him as "unavoidable." "Accidental hemorrhage" connoted the premature detachment of the placenta as we know it today. Following his description clinicians commonly regarded some ac-

through the kidneys following operation. In Case 3, it would appear that the recent onset of the hemorrhage did not permit enough time for absorption of the blood pigment at the time of urinalysis for hemoglobin just prior to operation.

In cases in which the diagnosis of ruptured ectopic pregnancy was established after the matter of hemoglobinuria had come to our personal attention, we have been able to demonstrate the pigment in the urine in four out of nine cases tested prior to operation. In one of these failures the history and physical findings had been rather confusing. The patient finally submitted to laparotomy because of persistence of symptoms that had been attributed to pelvic inflammation. About 40 gm. of old blood clots enmeshed in the omentum, but no fresh blood, were found. Urine examination had been negative. Doubtless, the amount of absorbed hemoglobin was well below the renal threshold level and consequently did not appear in the urine.

Norris clearly established the causal relationship between jaundice and certain cases of ruptured ectopic pregnancy, viz.: (1) The presence of free blood in the peritoneal cavity; (2) forthwith the development of jaundice; (3) the disappearance of the jaundice with the removal of the blood from the peritoneal cavity. Such a logical sequence and deduction might well also apply to the development of a hemoglobinuria. In the production of hemoglobinuria various interrelationships enter. Certainly the size and site of the hemorrhage are all important factors. Shortly after blood is shed and touches the peritoneal surface, it coagulates, according to DeLee, and is surrounded by a layer of fibrin. Under favorable circumstances, adhesions form and the blood becomes encapsulated. Absorption is impeded and the blood is more or less shielded against the action of lytic substances. Schottmüller hypothesized that autolysins might destroy the escaped red blood cells, with release of the hemoglobin. A similar view has also been expressed by Da Costa. The extravasated blood, according to Norris, is attacked not only by hemolysins, but in addition by proteoses and leucocytes. Hertzler²⁰ found that absorption of blood injected into the peritoneal cavity begins in four hours. Now, if the extravasated blood is rapidly broken down in the abdominal cavity, it is readily surmisable that its end-products are also quickly absorbed and disseminated throughout the body. The renal threshold, if exceeded, will permit the hemoglobin to escape in the urine. Smaller amounts can perhaps be demonstrated spectroscopically in the serum.

Whatever may be learned concerning the ultimate cause of hemoglobinuria, the consequential fact remains that it may be a not infrequent, and oftentimes a valuable, sign in the differential diagnosis of ruptured ectopic pregnancy.

LATE RESULTS IN THE TREATMENT OF LEUCOPLAKIC VULVITIS AND CANCER OF THE VULVA*

FRED J. TAUSSIG, M.D., ST. LOUIS, MO.

THERE has been ample discussion in the past concerning the classification, pathology, and treatment of leucoplakic vulvitis and carcinoma of the vulva. Recently we have had interesting contributions by Adair and Falls upon this subject. Concerning the ultimate outcome of treatment, however, we have as yet but little information. German literature contains a few analyses of operative results but in this country the subject has scarcely been touched upon.

The present study of the final results in the treatment of these two conditions is based upon the outcome of 74 cases of leucoplakic vulvitis and 112 cases of carcinoma of the vulva seen during the last thirty years. Previous to 1915 only a few cases came to our notice and all of these were given only palliative treatment. During the last twenty years, however, a method of operative treatment has gradually developed that has given not only temporary relief but in a surprisingly large percentage of patients has led to permanent cures. Unfortunately a large number of the women with leucoplakic vulvitis refused any operative measures. In carcinoma of the vulva the number who refused treatment was smaller but approximately 25 per cent were in such bad physical condition or had such extensive involvement that nothing more than a simple vulvectomy could be done. If at present a radical operation can be done in 75 per cent of vulval cancers in spite of the fact that the disease was present for longer than a year and that many had palliative treatment elsewhere, it certainly speaks well for the possibilities of accomplishment by this method.

Between 1915 and 1930, I observed 45 cases of leucoplakic vulvitis. Eighteen of these refused operation. Practically all of these patients also refused any follow-up of their condition so that I am unable to state what percentage, if any, later developed carcinoma. One patient upon whom I could make examination after an interval of five years showed no appreciable change in the appearance of the leucoplakic vulvitis although the pruritus had become somewhat less. There remained then 27 patients upon whom I had done a vulvectomy in the fifteen years preceding 1930. In ten of these the lesions were limited to a small area and only a partial vulvectomy was performed. In the remaining 17 patients a complete vulvectomy was done including two patients in whom retroanal skin was removed by the double anal bridge method of operation (Fig. 1).

*Read at the Seventh Annual Meeting of the Central Association of Obstetricians and Gynecologists, held at Omaha, Neb., October 10 to 12, 1925.

formation of cornified squamous cells in vaginal smears. These cells disappeared a few days after cessation of injection.

These vaginal changes have been utilized by Kaufman⁶ in the treatment of vaginal ulceration due to hormone disturbance. Lewis,⁸ has utilized the cyclical change in the vagina produced by injections of ovarian hormone in the treatment of gonococcal vaginitis in children. Brown,⁹ and Te Linde and Brawner, Jr.,¹⁰ have also reported favorably on the use of ovarian hormone in the treatment of vaginitis in children.

In order to determine whether the effect of these estrogenic hormones on the vagina would be of any value in the treatment of senile vaginitis, a series of twenty-five cases were placed under treatment with these substances.

The average age of these patients was fifty-one years, the youngest being forty-three and the oldest fifty-nine. They were all past the menopause. In the younger patients the menopause followed operations.

The chief complaints of these patients were a varying amount of whitish, rather thin vaginal discharge, with itching and a burning sensation in the external genitalia and vagina. Discharge was present in twenty-one of these patients, itching in eighteen, and burning sensation in thirteen. On examination the vulva was found to be atrophic and shriveled in the majority of patients; some presented reddening and hypertrophy of the labia, and in one patient the atrophy was associated with leucoplakia.

The vagina and the portio in every instance showed numerous small ulcerations, varying in size from a few millimeters to half a centimeter, stippling the mucosa.

The rest of the mucosa showed varying degrees of atrophy. The cervix and uterus were usually atrophic. Urine and blood examinations were all negative. In three patients *Trichomonas vaginalis* was found in the vagina.

Treatment consisted of the administration of estrogenic preparations by mouth, by mouth and by intramuscular injection, and by intramuscular injections alone. The preparation used for mouth administration was progynon, and that for intramuscular use, progynon, and theelin in oil. The medication was prescribed three times daily, whereas the injections were given once a week intramuscularly.

Three patients were treated by medication only. The treatment lasted from one to five and one-half months, the average time being two and one-half months. During this period total doses of from 27,000 to 630,000 mouse units were given. The average was 360,400 units. Six patients were treated by mouth and intramuscular injections over a period of from ten to twenty-eight months, the average time being fifteen months. During this time 210,000 to 630,000 mouse units were given by mouth and from 4,000 to 120,000 international units were given by injection. The average dosage was 360,500 mouse units by mouth and 33,000 international units by injection.

occasionally also of some irritation about the urethra from the scratching of the hairy skin to which it is approximated. Dyspareunia and pain on defecation due to vaginal and rectal postoperative stricture, formerly one of the chief drawbacks to these operative procedures, are no longer to be dreaded since I have been doing the posterior vaginal flap and double anal bridge operation. All in all, the operative results both immediate and late must be termed highly satisfactory. Since I have had but one operative death in 52 vulvectomies for leucoplakic vulvitis and that in a patient seventy years of age from embolism on the fourteenth day after operation, there can certainly not be said to be any special danger from this surgical procedure. I question whether any of the operations now being done to resect the local nerves or sympathetic plexuses can surpass these results either in the way of primary mortality or ultimate permanent relief. It is the generalized symmetrical type of leucoplakic vulvitis that gives us the most trouble, and here we must assume endocrine and neurogenic factors as the most likely cause. Resection of the tributary nerve supply should give temporary relief in such cases, but it remains to be seen how long the beneficial results of this nerve resection will last. It seems logical to suppose that as soon as the sensory nerves regenerate, the atrophic friable vulval skin will again be subjected to traumatism with a return of the old trouble. For this reason it is particularly important to study the late results of any method of treatment.

Coming now to carcinoma of the vulva, we are faced in our follow-up of cases with the fact that this is a disease not merely of old age, but of extreme old age. Approximately 60 per cent of the women were over sixty years and 30 per cent over seventy years of age. Naturally the normal life expectancy of such women cannot average more than about five years. It is therefore not fair to consider every death that occurs in the five- or ten-year period following operation as a failure to effect a permanent cure. Such a rule, justly applicable to cancer of the cervix with its average age of forty-five, cannot be extended to cancer of the vulva with an average of sixty years.

Out of 112 cases of vulval cancer under consideration in this review, 76 were seen before 1929. During this period a variety of procedures were employed: radiation, simple vulvectomy, vulvectomy with removal of superficial glands, and vulvectomy with double-sided Basset operation. A comparison of five-year results reported in 1929 and borne out by subsequent reports showed definitely the great superiority of the radical gland removal over any other measures. In this first series it showed 81 per cent five-year cures with the Basset operation compared to 30 per cent where only the superficial glands were removed, and no cures with radiation or simple vulvectomy.

AN ANALYSIS OF 569 FORCEPS OPERATIONS*

HOWARD F. KANE, A.B., M.D., F.A.C.S., AND HOWARD P. PARKER, M.D.,
WASHINGTON, D. C.

(From the Department of Obstetrics and Gynecology, George Washington University)

THE data presented in this paper have been compiled exclusively from the private practice of the authors. From January, 1932, to June, 1935, a careful, detailed record has been kept of all forceps operations performed by us, anticipating a time when the number would be sufficiently large to warrant an analysis. The group of cases which we wish to present consists of 569 cephalic presentations, 2 of which were brow, the remainder being vertex.

✓Number of forceps operations, 569, distributed as follows: High 1, mid 178, and low 390.

✓The indications were: Prophylactic 358, occiput posterior 121, transverse arrest 42, contracted outlet 21, inertia uteri 19, preeclamptic toxemia 6, and brow presentation 2.

The maternal morbidity among the midforceps (178) was 11 (6.17 per cent), with one death (59 per cent), and low forceps (390) was 29 (7.43 per cent).

The total maternal mortality therefore was 1 (0.18 per cent), and the maternal morbidity, 40 (7.04 per cent).

The number of patients requiring more than two weeks' hospitalization was 6 (1.23 per cent).

The following is a brief description of the fatal case.

White primipara, aged twenty-nine years. Physical examination and pelvic measurements were normal. She was admitted to the hospital in labor and during labor three rectal injections of paraldehyde and benzyl alcohol and three hypodermics of morphine sulphate, gr. $\frac{1}{4}$ were ordered for the patient. The technic used has been described by one of the authors¹ in a recent publication. The patient was delivered of a living female infant weighing 7 pounds 1 ounce by means of midforceps after manual rotation of a deep transverse arrest and a left mediolateral perineotomy. Eighteen hours after delivery the patient developed marked abdominal distention, which was relieved somewhat by pituitrin and enemas. Three days after delivery it was discovered that the patient had by mistake received a mixture of formaldehyde, paraldehyde, and benzyl alcohol per rectum during her labor. Appropriate antidotes were immediately given, but with little hope, as the action of formaldehyde on mucous membranes is extremely rapid. The patient died on the ninth postpartum day, death being due to (1) extensive ulcerative colitis, (2) generalized serofibrinous peritonitis, and (3) generalized toxemia.

*Read at a meeting of the Washington Gynecological Society, Washington, D. C., October 26, 1935.

from shock or hemorrhage. The operative mortality was therefore 4.6 per cent, assuredly low enough not to deter any competent surgeon from undertaking this extensive procedure.

If we consider now the 23 patients operated five or more years ago, we find one operative death, six who died of recurrences, one living but recently recurrent, and 15 who lived five years free of recurrence, *a five-year curability of 65 per cent.*

Out of 12 patients operated upon ten years or more ago four died of recurrence during this period. Three patients died of other causes without local recurrences before the ten-year period had elapsed. Leaving these three patients out of the calculation, we have left nine patients, five of whom lived for ten or more years free of recurrence; *a ten-year curability of 55 per cent.* Of these five patients, one died after eleven years of local recurrence, one died of senility twelve years later not recurrent, and one died of cancer of the cervix fifteen years later without local recurrence, leaving two living and well today, one eleven years and the other twelve years since operation.

The necessity of removing the tributary lymph glands is evident from the high percentage of cancerous involvement. In 26 out of the 43 Basset operations one or both sides showed metastases, an average of 60 per cent. In some of the remaining cases a small cancer metastasis might readily have been overlooked.

The advantage of blocking off the spread of the cancer by a thorough removal of the tributary glands is best witnessed by studying the recurrences. Out of 12 deaths from recurrence, three patients died of local recurrence, three of recurrence in the inguinal glands, two of distant metastases (brain, lungs) and in four insufficient data were available. We also had five patients who had small new cancers that appeared upon unremoved portions of leucoplakic skin about the vulva or anus. In these patients a secondary surgical excision was done and has been amply justified by the results obtained: one is living and well ten years since the second operation; one died recurrent seven years later, one died recurrent one year afterward, and two are of too recent occurrence to be considered. In none of these five cases was there any further glandular involvement or metastases to distant organs, indicating that this portal had been definitely closed by the Basset operation.

In illustration the following record is given: Mrs. L. McC., sixty-six years old, entered Barnard Free Skin and Cancer Hospital, Oct. 7, 1929, with an extensive carcinoma of the right labia and prepuce on a basis of leucoplakic vulvitis (Fig. 2). Vulvectomy was done October 8 and a double-sided Basset operation Oct. 22, 1929. She was free of recurrence until Aug. 4, 1931, when a small area of cancer 3x1 cm. above the urethra required excision. For four years more there was no recurrence. Then in July, 1935, an area of ulceration to the right of the anus was noticed. Examination showed a new carcinoma developing from the perianal leucoplakic skin that had not been completely excised (Fig. 3). This carcinoma

or more, born dead or dying within fourteen days of birth, and that such mortality rate be reported in an absolutely uncorrected form."

It seems desirable at this time to give a résumé of the methods practiced by the authors as regards the intrapartum care of the patients, reported in this series. But even before this résumé, let it be borne constantly in mind that all of these patients were private patients, they received adequate antenatal care, and entered the hospital in good physical condition. Proper and intelligent antenatal care certainly reduces the incidence of complications during the intra- and postpartum periods.

Practically all of the patients received one of two types of obstetric analgesia. In approximately one-third of the cases the Gwathmey method was employed, while the remaining two-thirds of the patients were given paraldehyde and benzyl alcohol according to the method recently described by one of the authors.¹ For the actual forceps delivery ethylene was used in the great majority of cases. When it was impossible to secure the services of an experienced anesthetist, ether was administered. The average length of labor for all types of cases as shown in Table II is certainly shorter than most generally accepted figures.

TABLE II. MISCELLANEOUS

	LOW FORCEPS		MIDFORCEPS	
	PRIMIPARAS	MULTIPARAS	PRIMIPARAS	MULTIPARAS
1. Number	183	207	121	57
2. Perineotomies	183	176	121	52
3. Average length of labor	14'23"	10'16"	18'48"	12'54"
4. Average number vaginal examinations	2.42	2.07	3.83	2.83

Vaginal examinations, with proper preparation of both the patient and the doctor, were performed at any time when an intelligent interpretation of the progress of labor was desired. The average number of vaginal examinations for all types of cases may be seen in Table II. Recalling that the total uncorrected maternal morbidity in this series is 7.04 per cent, it is our belief that vaginal examinations carefully performed in a proper environment entail no added risk to the patient.

When occipitoposterior positions are encountered, it is our custom to rotate manually and deliver by forceps if progress ceases for one hour, the head being in the pelvis and the cervix fully dilated.

The recent works of Caldwell, Moloy and D'Esopo⁵ upon the structure of the female pelvis and the effect of its variations upon the course of labor lead one to believe that in some instances the pelvis is best adapted to the passage of a head in the posterior position. Some operators accomplish rotation by means of forceps, after the method of Bill, or with the Kielland instrument. In this series it has seemed best to rotate in all cases and to rotate with the hand.

such a leucoplakic area. On the other hand, when such a leucoplakic island was left after operations for cancer of the vulva arising on a leucoplakic basis, we found that in the course of two to six years a new cancer developed upon such a leucoplakia in five out of approximately forty such combined lesions. It would seem from this that underlying constitutional factors are perhaps the basic cause of the cancer and the irritated leucoplakic skin merely "the match that starts the fire to burn."



Fig. 3.—Same case as Fig. 2. No recurrence in former operative wound or groin. Development of a new carcinoma in July of 1935 from the unexcised portion of perianal leucoplakic skin. Local excision Sept. 23, 1935.

The essential points in this analysis of late results are:

1. Leucoplakic vulvitis is permanently cured by vulvectomy in all but a few cases; occasionally a secondary excision is required.
2. The age incidence of cancer of the vulva is so high that many patients die of other diseases before the ten-year period has elapsed.
3. The five-year curability of 23 Basset operations for cancer of the vulva was 65 per cent. The ten-year curability was 55 per cent.

The etiology of supernumerary breasts or aberrant breast tissue is best explained by the darwinian theory of the "Descent of Man." It is an atavistic expression of our ancestral history or a reversion to lower animals. In whales, dolphins and lemurs we find the normal breasts at the vulva. Experience shows that the aberrant breast tissue is usually found along the primitive milk line, which is detected in 10 mm. embryos, from axilla to groin.

The presence of adenocarcinoma of aberrant breast tissue is not uncommon in the axilla or on the pectoral surfaces; however, no case has been reported of adenocarcinoma of aberrant breast tissue in the labia. Bell's case developed squamous cell carcinoma of the vulva three years after extirpation of the breast tissue. Fridel's patient presented herself with a fibroadenoma.

Mrs. F. R. (Hospital No. 27751), negress, forty-nine years of age, nullipara, was admitted to the Gynecological Service of our Hospital on July 24, 1935. She com-



Fig. 1.—General view of vulvar tumor containing breast tissue.

plained of vaginal bleeding and discharge. She was completely disoriented and her history was unreliable. From one of her relatives it was gleaned that she had been suffering from a growth in her vagina for one year. Physical examination revealed an emaciated and cachectic negress in the final stages of carcinomatosis. There was a hard and large inguinal adenopathy. In the region of the vulva there was a large mass (Fig. 1) 8 inches long and 6 inches wide at the base and originating in the vicinity of the right labia. On the opposite side there were numerous smaller masses extending for the entire length of the left labia. Upon separating the masses there were extensive areas of ulceration and sloughing. The vaginal canal or its remains was indurated and hardly the tip of the finger could be introduced. The rectovaginal septum was completely sloughed and the edges were thick and ulcerating. She was incontinent of feces and urine. Wassermann report was negative.

Clinical Diagnosis.—Carcinoma of vulva.

There were two biopsies taken, one from the mass on the right and another from the region of the junction of the mass with the vagina. The hospital pathologist, Dr. Hala, reported the following: "Sections show fibroblastic tissue in which there

We used x-ray for a time as a preliminary to the operation and found no advantage to it. *A priori*, I hesitate very much to do anything to the inguinal skin that will further increase the tendency to necrosis. I do not know how to prevent some necrosis after these operations and we only rarely get primary union. I wish I knew some way in which we could hasten postoperative healing. Not that it leads to serious complications, but it means a long stay in the hospital, and sometimes requires skin grafting and plastics.

We have had six cases of Bartholin's gland carcinoma in our series. In five out of the six the inguinal glands showed cancer. I consider this location for carcinoma as distinctly less favorable than the type that develops from leucoplakic skin.

THE ETIOLOGY, DIAGNOSIS, AND TREATMENT OF EVISCERATION FOLLOWING LAPAROTOMY*

ERWIN VON GRAFF, M.D., DES MOINES, IOWA

(From the Department of Obstetrics and Gynecology, State University of Iowa.)

THOUGH a properly performed laparotomy may be considered a comparatively safe procedure, there is hardly a surgeon of experience who has not occasionally encountered separation of an abdominal wound, with or without evisceration of the omentum and bowels. This distressing and often fatal surgical accident occurs far more frequently than it may appear. There are, however, but few reports on this subject in the literature.

v. Gusnar found 11 cases among 2,310 laparotomies (0.5 per cent); Starr and Nason 15 among 2,455 (0.61 per cent). From the material of the Presbyterian Hospital and the Surgical Department of Columbia University in New York, Meleney and Howes collected 55 cases, an incidence of 1 per cent, but assume that the actual incidence may be twice as high. R. Colp has reported 26 cases among 2,750 laparotomies (0.94 per cent). During a period of three years 9 cases of wound separation were noted among 567 laparotomies (1.58 per cent) in the Department of Obstetrics and Gynecology of the State University of Iowa.

Thirty years ago Madelung reported 175 cases with the appalling mortality of 29 per cent. After enumerating all the possible causes, such as vomiting, coughing, sneezing, straining during bowel movement, restlessness, sudden movement of the patient, and occasional wound infection, he concludes that none of them satisfactorily explained this "accident," which could be neither foreseen nor prevented.

Ries states that the disruption is initiated by separation of the fascia because of the sutures breaking, the suture knots giving way, or the tissue being cut by the sutures, and that in most cases the separation of the deeper layers occurs soon after operation: "The deeper layer then granulates, but doesn't heal together because the abdominal contents push in between the granulating edges. The second steps take place days or weeks afterward when the skin also gives way."

Freeman also stresses separation of the peritoneum and fascia soon after operation and claims that it is the wedging of the omentum between the edges of the fascia which prevents the healing of the superficial layers and is responsible for the peritoneal symptoms, such as nausea, meteorism, and abdominal distress.

*Presented before the Seventh Annual Meeting of the Central Association of Obstetricians and Gynecologists, Omaha, Nebraska, October 10 to 12, 1925.

ous small and large islands of neoplastic tissue infiltrating into the underlying subcutis a tendency to pearl formation and to keratinization are well marked" (Fig. 3).

Final Diagnosis.—Epidermoid carcinoma of vulva. Our patient died on Aug. 14, 1935, of carcinomatosis. No necropsy was obtainable.

Comment.—This case presents two types of carcinoma, the adenocarcinoma extremely rare, in aberrant breast tissue of the labia and the epidermoid carcinoma of the vulva. Perhaps the same irritating force that produced the vulva cancer was responsible for the carcinoma developing in the breast tissue.

REFERENCES

- (1) *Hartung*: Inaugural Dissertation: Erlangen—Germany, 1872. (2) *DeBlasio*: Arch. Di Psychiat. Torino 26: 171, 1905. (3) *Bell, J. Warren*: AM. J. OBST. & GYNEC. 11: 507, 1926. (4) *Purvis, R.*: Brit. J. Surg. 15: 279, 1927. (5) *McFarland, J.*: Arch. Path. 11: 226, 1931. (6) *Fridel, R.*: Virchows Arch. f. path. Anat. 286: 62, 1932. (7) *Mengerl, Wm.*: AM. J. OBST. & GYNEC. 29: 891, 1935.

855 OCEAN AVENUE

OBSERVATIONS ON THE USE OF COLLIP'S EMMENIN IN THE MENOPAUSE*

CATHARINE MACFARLANE, M.D., F.A.C.S., PHILADELPHIA, PA.

(From the Department of Gynecology, Woman's Medical College of Pennsylvania)

THE relief of the vasomotor symptoms of the menopause by means of endocrine substances has been an object of therapeutic endeavor since the introduction of the popular, but probably ineffective, "lutein tablets" of Fränkl in 1898.

Among recent additions to this list of substances is an estrogenic extract obtained from human placentas by Collip,¹ of Toronto, in 1930. This substance produces estrin in young animals but not in mature castrates. Collip called it "emmenin." He states that "it probably acts through stimulation of the intact ovary," and "we cannot expect relief from menopausal symptoms after panhysterectomy."

Collip² treated eighteen menopausal patients with emmenin. Fourteen of these women were relieved. "No relief was obtained in cases of long standing or in castrates. Cases of recent origin, less than one year after the last menstruation, gave the best results."

I have given this extract a trial, using Emmenin liquid (complex type). This is said to contain "the hormone emmenin, associated with ether-soluble placental principles."

The liquid was given by mouth, one teaspoonful in water three times a day, to eighteen women whose periods had ceased from six weeks to eighteen years. In eight of these women the menopause was physiologic. In seven of them, it was surgical (after bilateral salpingo-oophorectomy with or without supravaginal hysterectomy). In three women, the menopause had been produced by the intrauterine application of radium.

*Presented at a meeting of the Obstetrical Society of Philadelphia, October 3, 1935.

Poor nourishment, anemia, cachexia, advanced age, the presence of malignancy, syphilis, tuberculosis, jaundice, diabetes, and kidney lesions have been suggested as possible causative factors, depending upon which was present in the individual case. It has, however, never been proved that any one of these conditions, with the exception of diabetes, would seriously impair the process of healing.

Seven of our nine patients were otherwise healthy, not anemic, but noticeably obese women. Their ages ranged from thirty-two to sixty-four years. Sugar was found in the urine of one of the first five patients, but she was not considered diabetic. A sugar tolerance test taken seventeen months later revealed normal conditions. This does not, however, exclude the possibility that she may have had a hyperglycemia at the time of operation as it is known that injury may produce hyperglycemia in individuals with labile sugar metabolism.

Very much disturbed by the startling frequency of wound separations, five of which (one fatality) had happened within fifteen months, an attempt was made to ascertain, if possible, the reason for the discrepancy in the results at the clinics in Vienna and Iowa City. The following points seemed to be of importance:

	IOWA CITY	VIENNA
Suture material	Catgut	Silk
Food, as a whole	Rich	Moderate
Quality	Richer in carbohydrate	Poor in carbohydrate
Frequency of diabetes	Conspicuously above average	Average

From the foregoing it would seem imperative to give special attention to the sugar metabolism.

The findings in the following four cases of wound separation seemed to indicate that we had reached the correct conclusion. In Case 6, although the patient's urine was sugar-free on admission, the tolerance test on the twenty-second day following eventration revealed a mild diabetes with a high renal threshold. The length of time which had elapsed between the eventration and the test eliminated the possibility that the disturbance in the sugar metabolism might have been a temporary condition caused by the glucose administered postoperatively. In addition, healing of the secondarily infected laparotomy wound and of a burn on one leg was slow until the patient had been placed under diabetic management. Patient 7 was suffering from a severe diabetes, and in Cases 8 and 9 the blood sugar was unduly high.

Following this last experience, silk was used uniformly for the closure of the fascia, special consideration was given to the blood sugar in every obese woman, and no further evisceration occurred during the next six months.

It is hard to believe that the simultaneous occurrence of impaired carbohydrate metabolism should be merely accidental in four successive

PHYSIOLOGIC MENOPAUSE

CASE 1.—A. S., aged fifty. Periods irregular for one year. Last period March, 1935. In July, 1935, she came complaining of hot flashes, dizziness, nausea, and insomnia. Emmenin was prescribed, teaspoonful three times a day. Symptoms were definitely relieved. In September, 1935, patient reported symptoms much less severe; takes emmenin intermittently; "would not be without it."

CASE 2.—E. A., aged forty-two. Her periods ceased abruptly July, 1934. In January, 1935, she complained of frequent, severe hot flashes, insomnia, headache, and depression. Blood pressure 160/80. Emmenin was prescribed. On January 25, she reported marked relief of symptoms. Blood pressure 128/70. In May, 1935, patient came again on account of the same symptoms, having discontinued emmenin for two months. After resuming its use, she again reported prompt relief.

CASE 3.—H. M., aged forty-two. Periods were scanty and infrequent for six months. Last period March 10, 1935. June 2, 1935, she complained of dizziness and hot flashes followed by drenching perspiration. Emmenin was prescribed with prompt relief of symptoms.

MENOPAUSE AFTER BILATERAL SALPINGO-OOPHORECTOMY AND
HYSTERECTOMY

CASE 1.—M. S., aged forty-nine. On Dec. 17, 1934, supravaginal hysterectomy and bilateral salpingo-oophorectomy. On April 8, 1935, she complained of severe hot flashes, headache, insomnia, and nervousness. Blood pressure 150/80. Emmenin was prescribed. After one month, patient reported no headaches, no hot flashes, and no insomnia. In September, 1935, she reported symptoms much less severe; takes emmenin occasionally; positive it helps her.

CASE 2.—D. M., aged forty-three. On May 3, 1934, supravaginal hysterectomy and bilateral salpingo-oophorectomy on account of pressure producing myoma with adherent appendages. In December, 1934, she complained of severe hot flashes which were not relieved by theclol. Emmenin was prescribed with definite improvement.

RADIUM MENOPAUSE

CASE 1.—A. R., aged forty-three. On March 3, 1935, she received intrauterine application of radium (2,400 mg. hr.) on account of dysfunctional bleeding. On April 24, 1935, patient complained of hot flashes, dizziness, headache, and nervousness. Blood pressure 140/70. Emmenin was prescribed with marked relief of symptoms.

SECONDARY PHYSIOLOGIC MENOPAUSE

CASE 1.—F. G., aged fifty. In 1921 a bleeding myoma of the uterus was removed by supravaginal hysterectomy; the ovaries were not removed. In 1935, patient complained bitterly of hot flashes, headache, dizziness, depression, confusion, and exhaustion; blood pressure 180. Emmenin prescribed with amazing relief of symptoms.

CASE 2.—E. R., aged fifty-three. On Oct. 10, 1932, intrauterine application of radium (6,000 mg. hr.) on account of beginning carcinoma reported in tissue removed in the course of a cervical repair. Cessation of periods was followed by vasomotor disturbances which continued for about a year and a half. After one year's freedom from symptoms, they returned in February, 1935. Emmenin was prescribed with marked relief. In September, 1935, patient was positive that emmenin helped her.

always occurs unexpectedly and has to be cared for as an emergency. In addition there is no possibility of proper disinfection of the field of operation after the evisceration has taken place. Therefore, early diagnosis, i.e., before the skin has given way, would be of greatest benefit.

TABLE I

AUTHOR	NUMBER OF CASES	RECOVERED	DIED	MORTALITY PER CENT
Madelung, 1905	148	105	43	29.0
Ries, 1909	6	5	1	16.6
Holtermann, 1925	15	8	7	47.0
Weber, 1926	4	4	—	—
v. Gusnar, 1928	11	3	8	72.7
Horner, 1929	4	1	3	—
Sokolov, 1931	725	—	—	32.0 if closed 35.4 open treatment
Sigalas, 1932	8	—	—	18.5
McCauliff, 1933	3	3	—	—
Meleney, 1934	50	28	22	44.0
Colp, 1934	26	—	—	28.0
Baer and Reis, 1934	7	6	1	14.28
Eliason and McLaughlin, 1934	19	11	8	42.0
v. Graff, 1935	9	8	1	12.5

The accident can occur without any premonitory symptoms following a normal postoperative course, as in three of our patients (Cases 1, 2 and 6). In a fourth patient (Case 5), who was an epileptic and had several severe seizures after operation, diagnosis was impossible. In five of our nine patients, however, the event might have been suspected.

There are two groups of symptoms and signs, the "early" caused by separation of the peritoneum and fascia and incarceration of omentum, resulting in nausea, distention, local pain, vomiting, general malaise and poor appetite; and the "late," i.e., the situation at removal of the skin clips or sutures, when the wound often lacks a healthy appearance (Cases 3, 7) or may be partially separated with the edges devoid of granulations, and probing shows a widespread cavitation under the skin.

Early symptoms were sufficiently developed in three of our patients (Cases 3, 4 and 8) to arouse suspicion. Sugar tolerance tests and blood sugar determinations might have revealed the diabetes and confirmed the suspicion. It might have been possible to save the life of the patient who died (Case 3). In this particular instance there was a bloody serous drainage through a small hole in the upper end of the skin incision, which was indicative of a rupture of the deep layers. Complete evisceration occurred only four days later after skin clips were removed. In two cases (7 and 9) the skin had separated partially, and there was considerable drainage so that evisceration should have been anticipated.

As a whole, the proper evaluation of "early" symptoms is more important because there is sufficient time for the blood sugar determination, which will permit timely recognition of the danger. On the other

MASSIVE COLLAPSE OF THE LUNG COMPLICATING PARTURITION

HARRISON BETTS WILSON, M.D., HACKENSACK, N. J.

SIR JOHN ROSE BRADFORD defines massive collapse of the lung as "an unusual condition in which the lung without the pressure of any gross lesion such as bronchial obstruction, pleural effusion, etc., interfering with the free entry of air, causes airlessness to a great or less degree."

Up to the present time four principal theories or hypotheses have been set forth as possible explanations of massive collapse of the lung.

1. Pastenr¹ advanced the theory that the collapse of the lung was due to pressure exerted by the collapsed chest wall and elevated diaphragm which resulted from paralysis of these structures. Under this condition respiration became sluggish, and permitted the collection of secretions in the bronchioles which caused this obstruction, and the air remaining in the alveoli of the obstructed area was absorbed by the circulating blood. Therefore he places pressure of the chest wall and diaphragm as primary, and the lung collapse as secondary causes.

2. Briscoe² states that "due to the onset of inflammation affecting the muscles of the crus situated behind the peritoneum, one-half of the diaphragm and its synergistic and antagonistic muscles are out of action owing to the inflammation of the muscle or the pleural membrane covering it." The resultant respiratory disturbance leads to collapse.

3. Jackson and Lee³ contend that "obstruction of the bronchioles by secretions is the entire explanation, such a condition being all that is necessary for all the other factors of the condition, any disturbance of the respiratory function being incidental."

4. Bradford⁴ advances the explanation that "some spasmodic reflex of the bronchioles causes them to become occluded, thereby permitting future absorption of air in the segment of the lung involved."

Sante⁵ summarized the hypotheses of this condition by saying "the cause is not known, but it seems most probable that some infection or insult to the region of vagus supply produces a reflex action on the bronchioles permitting their temporary collapse. Once approximated, the walls of these bronchioles are held in apposition by cohesion, collapse of the lung following, owing to the absorption of alveolar air by the circulating blood. Relief of the obstruction results in the sudden re-inflation of the lung."

Potter⁶ states that "the treatment is first postural, the patient being turned on his side with the involved lung uppermost and induced to cough. This treatment will cause the lung to re-inflate and the symptoms to subside. If the case is of short duration, the lung clears very rapidly, but in cases that have existed a few days there may be some delay due to an accumulation of mucus which is Nature's method of producing cough and finally recovery. These cases may have an abundant mucous expectoration. If postural treatment does not re-inflate the lung, bronchoscopy is indicated." This procedure is not generally known or appreciated by the profession.

OCCURRENCE

The cases reported thus far in the literature have either followed from some distinct condition such as diphtheria, poliomyelitis, streptococcus septicemia, or some insult to the nervous supply of the vagus, abdominal or chest injuries or operations.

malaise, distention, nausea, serous bloody drainage beginning third day. Disruption suspected, occurred on the seventh day. No healing reaction. Immediate closure. Deceased seventh day following closure. Postmortem: Thrombophlebitis, sepsis, localized peritonitis.

CASE 4.—M. R., aged sixty-four years, Hospital No. H 1772. Twisted pedicle cyst of right ovary; obesity. Feb. 21, 1933, extirpation of cyst and abdominal total hysterectomy under spinal anesthesia. General malaise and depression, distention, nausea, localized pain. Skin clips removed on sixth day; wound appeared unhealthy. Up in chair on eighth day, disruption ninth day. No infection, no healing reaction. Immediate closure. Recovery.

CASE 5.—S. L., aged forty-six years, Hospital No. H 2796. Fibroid uterus; epilepsy. March 23, 1933, abdominal total hysterectomy under gas-ether. Repeated seizures. Removal of skin clips on sixth day, disruption on seventh day following a seizure. Immediate closure. Recovery.

CASE 6.—E. C., aged forty-three years, Hospital No. H 3607. Fibroid of uterus; psychosis. June 22, 1933, abdominal total hysterectomy. Uneventful course. Disruption of laparotomy wound sixth postoperative day. Secondary closure. Blood sugar determinations twenty-two days following disruption revealed a mild diabetes with high renal threshold. Recovery.

CASE 7.—M. E., aged forty-seven years, Hospital No. H 9784. Fibroid of uterus; obesity. Severe diabetes with blood sugar of 297 mg. per cent. Diabetic management before operation. Sept. 15, 1933, abdominal total hysterectomy. Nausea. Skin clips removed sixth day, wound appeared unhealthy. Disruption on the seventh day, the fascia apparently having given way on the second postoperative day. Immediate closure in layers with six through-and-through retention sutures. The accident was probably due to the fact that operation was performed after the blood sugar had been reduced from 297 to 157 mg. per cent for only one day and the diabetes was therefore not fully controlled. The blood sugar rose suddenly following the first and second operations to 241 and 226 mg. per cent respectively, and the poor healing of the wound required considerable increase in the insulin dosage. Recovery.

CASE 8.—M. B., aged fifty-four years, Hospital No. H 8561. Adenocarcinoma of body of uterus; obesity. Deep x-ray treatment. Two months later, Oct. 13, 1933, abdominal total hysterectomy under spinal anesthesia, plus ethylene-ether. Postoperative course unsatisfactory: general malaise, subfebrile temperature, poor fluid intake, nausea, vomiting. On the seventh postoperative day skin clips were removed. Skin was found separated with a piece of omentum in the wound. Immediate closure in layers with additional retention sutures. Sugar ++++; blood sugar in spite of diabetic management 159 mg. per cent three weeks after operation. Recovery.

CASE 9.—H. F., aged fifty-nine years, Hospital No. H 13782. Postmenopausal bleeding; obesity. Dec. 16, 1933, abdominal total hysterectomy under spinal anesthesia. Sixth day skin clips removed. Skin partially separated with profuse discharge of bloody serum. Disruption suspected, but recognized only on the fourteenth day. Immediate closure in layers. Sugar++; blood sugar 155 mg. per cent. Recovery.

CASE 10.—M. B., aged fifty years, Hospital No. J 5543. Cancer of cervix, Schmitz II, fibroid of uterus and obesity. May 31, 1934, abdominal radical operation (Wertheim) under spinal anesthesia. Postoperative course: moderately febrile, but otherwise uneventful. On the seventh day a fluctuating abscess developed, which was evacuated by blunt separation of the skin incision in its full length. The sutures of the fascia seemed to be intact. Blood chemistry revealed a blood sugar

and was having good strong contractions with no evidence of rotation. The membranes were ruptured and an attempt was made to rotate the head with Tucker-McLane forceps. This maneuver was unsuccessful and version and extraction were then done under ether anesthesia with a small midline episiotomy. There was no postpartum hemorrhage and the patient left the delivery room in good condition. Approximately two and one-half hours later she began to cough and became very



Fig. 2.—Second examination, four days after delivery. Moderate incomplete massive atelectasis of right lung, and moderate retraction of heart to right.

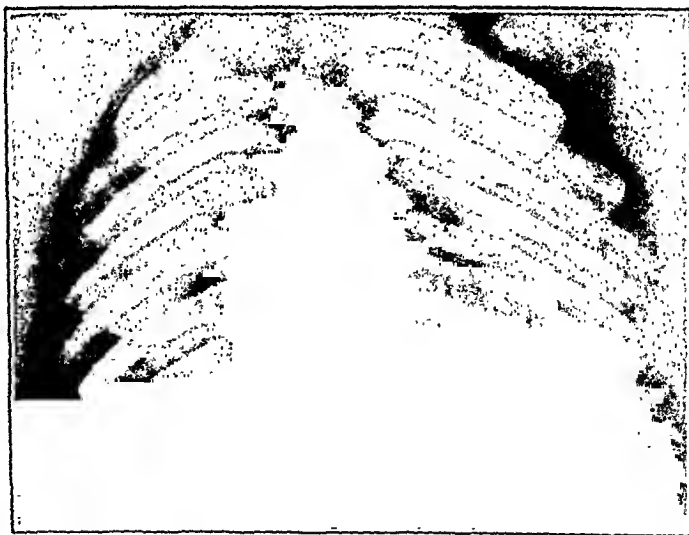


Fig. 3.—Third examination, five days after delivery. Complete recovery.

apprehensive. Her respirations increased to thirty-six per minute and the pulse rate to 140. She complained of pain in the right side of her chest. At this time she was raising purulent sputum streaked with blood. Our first thought was that the patient was developing pneumonia. We ordered supportive treatment and an x-ray of the chest. Auscultation elicited coarse râles over the entire right side, loudest toward the median line. On March 25, an x-ray showed a massive atelectatic collapse of the right lung. March 31, another x-ray showed the collapse of the lung

dominal Incisions, Arch. Surg. 14: 600, 1927, v. Gusnar, K.: Arch. f. klin. Chir. 150: 636, 1928. Halsted, W.: Bull. Johns Hopkins Hosp. 1: 29, 1924. Harvey, S. C.: Arch. Surg. 18: 1227, 1929. Holtermann: Zentralbl. f. Gynäk. 49: 213, 1925. Horner, D. A.: J. A. M. A. 93: 1126, 1929. Howes, E. L.: J. A. M. A. 90: 530, 1928. Howes, E. L.: Surg. Gynec. Obst. 57: 309, 1933. Howes, E. L., and Harvey, S. C.: N. E. Med. J. 200: 1285, 1929. Howes, E. L., and Harvey, S. C.: Internat. J. Med. & Surg. 43: 225, 1930. Howes, E. L., Sooy, J. W., and Harvey, S. C.: J. A. M. A. 92: 42, 1929. Kraissel, J. C., and Meleney, F. L.: Surg. Gynec. Obst. 59: 161, 1934. Lahcy, F. H.: J. A. M. A. 89: 1735, 1927. Madelung, O.: Arch. f. Chir. 77: 347, 1905. McCauliff, G. T.: J. Iowa State Med. Soc. 23: 347, 1933. Meleney, F. L., and Howes, E. L.: Ann. Surg. 99: 5, 1934. Ries, Emil: Am. J. Obst. & Dis. Women 60: 569, 1909. Shipley, A. M.: Ann. Surg. 82: 452, 1925. Sigalas, M.: Revue de Chir. 51: 32, 1932. Sokolov, S.: Vestnik Khir 65, 66: 219, 1931 (abstracts in Surg. Gynec. Obst.; Internat. Abstract of Surgery 55: 157, 1932). Starr, A., and Nason, N.: J. A. M. A. 100: 310, 1933. Weber, M.: Zentralbl. f. Chir. 53: 277, 1926.

DISCUSSION

DR. EARL C. SAGE, OMAHA, NEB.—The new viewpoint that “disturbance of the carbohydrate metabolism is an important, if not the only, cause of postoperative separation of abdominal incisions,” is worthy of consideration. Personally, I would not take such a decided stand, as I believe that there are other predisposing and exciting causes.

We can say that the *predisposing causes* of disruption of abdominal wounds are senility, decrepitude, malignancy, jaundice and a peculiar body tissue function that dissolves catgut earlier than usual. As Dr. von Graff has pointed out, the diabetic state should also be included here. The exciting causes are constant coughing, hiccupping, sneezing, distention, undue abdominal strain, and infection.

Kennedy, drawing on the combined surgical experiences of himself and Joseph Price, during fifty-six years, reported that not a single disruption of an abdominal wound occurred with the use of through-and-through silkworm-gut sutures. He recommended the omission of all absorbable sutures, especially in the closure of wounds in layers. There is the equally impressive statement by Baldwin, that he performed 16,465 laparotomies without a dehiscence using No. 2 chromic catgut throughout in the closure of the layers of peritoneum, muscle, fascia and skin, and silkworm-gut for stay sutures. He particularly emphasized the use of the binder throughout the postoperative period and convalescence. As a contrast is the report of Sokolov, who, in 1932, collected and reviewed 730 cases of wound rupture after laparotomy and concludes from 1,000 questionnaires sent to surgeons in Europe that disruption of the abdominal wound takes place in 2 to 3 per cent of abdominal operations.

The traction force of any kind of absorbable material is of short duration. It loses its tensile strength long before it is absorbed. Howes, in the experimental department of Yale University, finds that chromic twenty-day No. 1, with a normal strength of twelve pounds, in twelve hours has a strength of six pounds, in twenty-four hours of two and one-half pounds, in thirty-six hours, 0. The holding strength of a stitch in fascia varies from seven to eight and one-half pounds. The holding strength of a strand of No. 0 catgut is nine pounds; thus, before a strand of catgut will break, it will tear through the tissue.

Baldwin has furthermore reviewed the experience of five surgeons in New York City as given in their papers at the November, 1933, meeting of the New York Surgical Society, where they admitted that by their techniques they average one, two, or even three disruptions, with exposure or extrusion of abdominal contents, in every 100 abdominal operations. In none of the hospitals from which their reports came were retention sutures a routine measure.

sulphonaphthalein and urea clearance tests were within normal limits, although, in the immediate antepartum period, the patient developed a mild toxemia of pregnancy which was controlled by bed rest.

April 19, 1935, she delivered spontaneously after a six-hour labor. A male child weighing 3,060 gm. (7 pounds and 12 ounces) was born without mishap other than moderate postpartum hemorrhage. Without thyroid medication the patient's basal metabolic rate dropped to minus 18 per cent within two weeks. Blood cholesterol* fell to 210 mg. per cent, having been 360 mg. per cent during labor. However, this value rose to 243 before desiccated thyroid was resumed during the third postpartum week.

The infant was apparently normal by physical and roentgenologic examinations. No thyroid gland was palpable. The infant was fed an evaporated milk formula without breast milk and gained 300 gm. in three weeks.

Cord blood contained 146 mg. per cent cholesterol as compared to the high value found in the mother's blood during labor. The infant's plasma cholesterol was present in 137 mg. per cent on the third day, 113 on the sixth, and 103 on the twelfth day. Cord blood contained creatinine in 1.5 mg. per cent.† On the sixth day the total twenty-four-hour urinary excretion of creatine was 16 mg., with 24 mg. of pre-

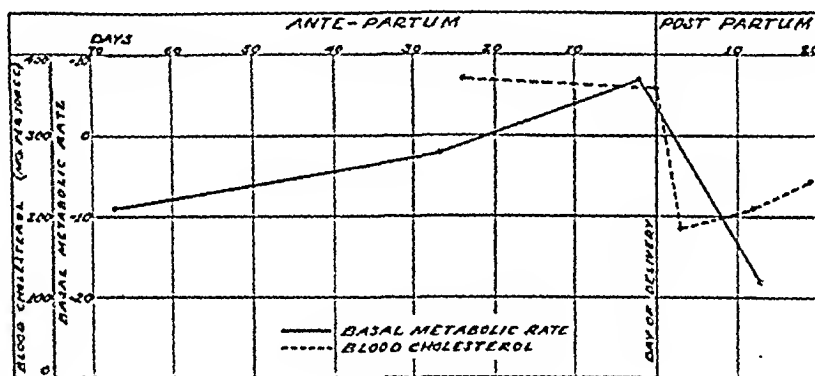


Fig. 1.

formed creatinine. On the twelfth day there were 33 mg. of creatine and 64 mg. of preformed creatinine. The creatinine coefficients for the sixth and twelfth days were 12.9 and 31.2, respectively.

CONCLUSIONS

The cholesterol content of the cord blood and that during the first week were higher than the normals found by Gordon and Cohn,¹ but, thereafter, the values fell to average figures. If creatine excretion can be used as an index of an infant's metabolic rate, as suggested by Poncher and others,² it may be inferred that the metabolism of this infant was sluggish immediately after birth but rose during the investigative period. This inference is borne out by the decrease in cholesterol which would seem to indicate increased metabolism.³ Apparatus was not then available for calorimetric studies.

The evidence at hand leads us to believe that an essentially normal individual was born of a sporadic cretin mother whose own metabolic rate had been maintained at a satisfactory level during most of her pregnancy without medication. Congenital thyroid enlargement, as has been found in animals born of thyroidectomized mothers,⁴ has been anticipated but not found in a case similar to ours.⁵ An elevation of

*Cholesterol values were obtained by the Sackett modification of the Bloor method.

†The methods of Folin were used for determinations of blood creatinine and urine creatine and creatinine.

DR. VON GRAFF (closing).—When silk or stay sutures are used, they may, in spite of impaired healing, minimize the incidence of disrapture by holding the tissue sufficiently long in contact. During this period, the patient may overcome any temporary impairment of the sugar metabolism.

We occasionally see the very rapid development of incisional hernias. The fascia is always found separated but the subcutaneous tissues and skin have healed, thus preventing evisceration. If there had been an impairment of the healing tendency, such as in diabetes, the separation would have involved, not only the fascia, but the rest of the abdominal wall.

HORMONAL STUDIES WITH THE OVIPOSITOR LENGTHENING REACTION OF THE JAPANESE BITTERLING*

AARON E. KANTER, M.D., CARL P. BAUER, M.D., AND
ARTHUR H. KLAWANS, M.D., CHICAGO, ILL.

(From the Department of Obstetrics and Gynecology of Presbyterian Hospital and Rush Medical College of the University of Chicago)

IN A preliminary report¹ the authors demonstrated what was believed to be a biologic test for the estrogenic hormone present in excessive amounts in the urine from pregnant women. As was feared, it was immediately assumed by many of our readers that we were advocating a new biologic test for pregnancy and because of such misinterpretation the caution that was exercised in avoiding definite conclusions was apparently unavailing. From our further studies as well as the published work of Szusz,² Fleischmann and Kann,³ and Ehrhardt and Kuhn,⁴ estrogenic substance is fairly firmly established as the exciting factor in the production of the phenomenon that constitutes the criterion for the test. For this work the Japanese bitterling (*Acherlognathus intermedium*) was used because the female of this fish has an ovipositor which is always visible to the naked eye. Only fish that had been standardized according to the technic we have described were used. Our reports are the only ones in which such standardized fish had been used exclusively. As our studies progressed, it became more and more apparent that the bitterlings, like any other animals used for checked investigative work, must be put through a standardization process before results could be comprehensively evaluated. The process is simple and the mortality among the fish is less than 2 per cent. The work of Kotz, Douglas and Parker⁵ illustrates this point. We have experienced no particular difficulty in keeping the fish alive in our tanks and through a large series of often repeated tests, except at one time when a supply of the German bitterlings (*Rhodeus amarus*) introduced a fatal fungous infection.

Normally, during the breeding season (April 15 to July 1), and in the presence of the male, the ovipositor elongates from its latent 2 to 4 mm.

*Presented at the Seventh Annual Meeting of the Central Association of Obstetricians and Gynecologists, Omaha, October 10 to 12, 1935.

The blastocyst situated superficially in the endometrium is surrounded by a few short mesodermal villi. There is a little degeneration of the tissues where the fetal and maternal portions join. The walls of a few venous spaces have been penetrated and in some places replaced by fetal trophoblast. At the point of entrance of the ovum is an adherent organized blood clot. Beneath the ovum are large venous spaces and several endometrial glands distended with blood. The uterus was not touched or traumatized during the process of obtaining and fixing the specimen.

The embryonic anlage is attached at the deepest pole of the chorion by a short body stalk. There are no blood vessel formations in the stalk.

The amnion in cross-section is triangular with the peak embedded in the stalk. At the apex of the triangle the cells of the amnion are cuboidal and in several layers in contrast with the thin, elongated cells of the lateral walls. At the junction with the embryonic disc there is an abrupt change from one to the other.

The embryonic disc is almost flat except for a slight upward curve at the lateral, cephalic, and caudal edges. The cells are two or three layers deep in places. The ventral surface of the disc is distinctly separated from the entoderm by a sharp basement membrane. There is no mesoblastic tissue between the disc and the yolk sac.

The yolk sac is smaller than the amnion. Beneath the disc, the entodermal cells are cuboidal and are arranged in a single row. The other cells of the yolk sac are thin and elongated. There is no formation of blood vessels in the wall.

104 SOUTH MICHIGAN AVENUE

DISCUSSION

DR. J. P. GREENHILL.—The fact that five ova less than twenty days of age are reported by one group of workers is astounding. In the entire world literature there are less than 75 ova as young as this.

Dr. Fitzgerald said that the menstrual ages of the two cases reported in detail was identical and yet one ovum was nineteen days old whereas the other was only fourteen days of age. All authors including myself, who have reported studies of young ova have specified the age of the ovum in days. However, undoubtedly in the future we shall have to revise the ages of ova already reported. The reason for this is that there are too many unknown factors in the process of ovulation, fertilization, and growth. For example, we do not know in the human being the exact day of ovulation, the exact time of fertilization, and the time it requires for a fertilized ovum to traverse the fallopian tube to reach the uterine cavity. We are not certain of the exact duration of time human ova and sperm are capable of fertilization although we are almost sure the period of time is a matter of hours. We do not know when a fertilized ovum is ripe enough for implantation in the endometrium nor at what stage in the development of the endometrium an ovum is capable of being received. Furthermore, in some instances at least, clinical data concerning the dates of coitus and menstruation are not accurate. There is no unity of opinion concerning which structures of the ovum should be used as the criterion for the determination of the age of an ovum. Some authorities believe it should be the trophoblast whereas others consider the stage of development of the embryo a more reliable index. Again not all ova of the same stage of growth are necessarily of the same age. There may be differences in the rate of growth in young ova just as there are variations late in intruterine life and in extruterine existence.

DR. HAROLD O. JONES.—If tissue is to be of any value for accurate study, it should be fixed and examined at once, which means that we should organize our

generous samples of his purified estrogenic substances theelin, theelol, and dihydrotheelin in 0.05 NaOH solution. We wish, at this time, to express our most sincere thanks to Dr. Doisy for his willing cooperation. Tables I and II show the results of this work, the interesting features of

TABLE I. OVIPOSITOR LENGTHENING REACTIONS OBTAINED WITH VARIOUS HORMONAL PRODUCTS

PRODUCT	AMOUNT	24 HR.	48 HR.	REACTION			
				72 HR.	96 HR.	120 HR.	2 WK.
Theelin Parke, Davis Co.	100 R.U.	Neg.	Pos.	Pos.			
	150 R.U.	Neg.	Pos.	Pos.			
	300 R.U.	Neg.	Pos.	Pos.			
Progynon Tablet	22½ R.U.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.
Schering	45 R.U.	Pos.	Pos.				
Ether extract of	45 R.U.	Pos.	Pos.				
Ether residue of	45 R.U.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.
Emmenin Ayerst, McKenna and Harrison	1 c.c.	Pos.	Pos.	Pos.			
	1 c.c.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.
	2 c.c.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.
	3 c.c.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.
	4 c.c.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.
Amniotin Squibb Suppository	50 R.U.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.
	150 R.U.	Pos.	Pos.	Pos.			
	1	Pos.	Pos.	Pos.			
Theelin Doisy	100 R.U.	Neg.	Neg.	Neg.	Neg.	Pos.	Pos.
	200 R.U.	Neg.	Neg.	Neg.	Neg.	Pos.	Pos.
	300 R.U.	Neg.	Neg.	Neg.	Pos.	Pos.	Pos.
	400 R.U.	Neg.	Neg.	Neg.	Pos.	Pos.	Pos.
Theelol Doisy	5 R.U.	Neg.	Neg.	Neg.	Neg.	Neg.	Pos.
	10 R.U.	Neg.	Neg.	Neg.	Neg.	Pos.	Pos.
	15 R.U.	Neg.	Neg.	Neg.	Pos.	Pos.	Pos.
	20 R.U.	Neg.	Neg.	Neg.	Pos.	Pos.	Pos.
Dihydrotheelin Doisy	825 R.U.	Neg.	Neg.	Neg.	Neg.	Neg.	Pos.
	1,650 R.U.	Neg.	Neg.	Neg.	Neg.	Neg.	Pos.
	2,067 R.U.	Neg.	Neg.	Neg.	Neg.	Pos.	Pos.
	2,475 R.U.	Neg.	Neg.	Neg.	Neg.	Pos.	Pos.
Pregnancy urine Ether extract of Ether residue of	4 c.c.	Pos.	Pos.	Pos.			
	4 c.c.	Pos.	Pos.	Pos.			
	4 c.c.	Neg.	Neg.	Neg.	Neg.	Neg.	
Antophysin Winthrop	1,000 R.U.	Neg.	Neg.	Neg.	Neg.	Neg.	
APL Ayerst, McKenna and Harrison	1,000 R.U.	Neg.	Neg.	Neg.	Neg.	Neg.	
Antuitrin-S Parke, Davis Co.	1,000 R.U.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.
Pure Prolan Dr. Lawrence Univ. of Chicago	1,000 R.U.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.

On admission on June 24, 1934, the patient was in active labor. A small fetus presented as L.O.A. The fetal heart was audible in the left lower quadrant, regular in rate and rhythm. Rectal examination revealed the presence of a stricture about one inch from the anal orifice. It was firm and inelastic and did not admit the examining finger. Feces were seen emerging from the vagina. General physical examination was negative save for a systolic murmur heard over the precordium. The urine was negative and the blood pressure was 116/70.

Because of the rectal stricture and the contamination of the birth canal by feces, labor was permitted to proceed without further examination. The vulva and perineum were repeatedly flushed and cleansed and three hours after admission the patient delivered spontaneously a male infant weighing five pounds and eleven ounces. The perineum was intact. The placenta and membranes were expressed after separation. Blood loss was estimated at 150 c.c. The general condition immediately following delivery was good. The patient was returned to her bed on the ward one hour later.

Seven hours following delivery, the patient was found in a state of profound collapse, anxious facies and covered with perspiration. The pulse was small, thready, and 160. Blood pressure was 86/40. The abdomen was markedly distended and, through a huge diastasis the distended gut was percussed. The recti to each side were rigid. There was moderate lochia but no free vaginal bleeding.

Immediate efforts were made to combat shock with morphine, intravenous infusion of glucose and saline, external heat and the Trendelenberg position with some improvement in the next two hours. At the end of that time, the pulse again became thready and small and the blood pressure dropped farther. In the presence of this persistent shock and the extreme abdominal distension, surgical consultation was requested. It was the opinion of the consultant that rupture of the sigmoid or rectum above the point of stricture was probable.

With collapse persisting, operative intervention was held untenable. A transfusion of 500 c.c. of citrated blood was performed in a further attempt to relieve shock.

Despite all efforts, collapse persisted and deepened and, sixteen hours following delivery, death supervened.

Relevant Necropsy Findings (Dr. E. Holder, Resident Pathologist).—The general peritoneal cavity contained from 1,500 to 2,000 c.c. of "pea soup like" fluid mixed with fecal matter and having a marked fecal odor. The stomach and small intestines were distended. The omentum was rolled up on itself and was adherent to loops of small gut. All the abdominal viscera were covered by a grayish purulent exudate.

The uterus was lifted from the pelvis. Upon sponging the culdesac clean and exposing the anterior rectal wall, an opening in the rectum was seen, 1.5 to 2 cm. in diameter, which freely communicated with the general peritoneal cavity. There were no adhesions or exudates about the rectal opening.

The bladder mucosa was thin and there was marked congestion of the superficial vessels.

The vaginal mucosa was hemorrhagic; 1.5 cm. from the vaginal orifice an opening 0.5 cm. in diameter was seen, and a probe passed into it emerged at a similar opening in the rectum.

The lower uterine segment was elongated and the vessels were congested. The endometrium was dark and hemorrhagic.

The rectal mucosa was dull gray, 2 cm. from the anal orifice there was an opening which connected with the vaginal opening aforementioned. There was a constriction of the lumen 4.5 cm. from the anal orifice due to dense infiltration of the rectal wall. It was impossible to pass the finger through this constriction. The

Fleischmann and Kann⁸ have recently published another report in which they state that the estrogenic hormone is the activating principle in the production of ovipositor lengthening. Their evidence is very similar to that which we have presented in Tables I and II.

We must again preface our presentation with a warning against misinterpretation of the type that led Kleiner, Weisman, and Barowsky⁹ to publish their report. Aschheim¹⁰ states that very early in pregnancy there is an increase in the amount of anterior pituitary-like gonadotropic hormone in the urine which reaches a maximum early and maintains this throughout the life of the pregnancy, while the urinary estrogenic hormone content reaches a demonstrable level at about the midpoint in the pregnancy and increases greatly in amount from this time to the end of gestation. Further, he brings out that with the death of the pregnancy the gonadotropic hormone excesses are quickly dissipated. In our work, urine from patients in which the gonadotropic hormone excesses have proved to be dissipated, contains estrogenic hormone in sufficient quantity to give a positive test upon the fish. It is because of such evidence that we might expect a test dependent upon the estrogenic hormone to be of less value in the detection of very early pregnancy than those tests dependent upon the gonadotropic hormone for their efficiency (Aschheim-Zondek and Friedman tests). Conversely, a test for excesses in estrogenic hormone would prove more valuable as a diagnostic aid in conditions where the pregnancy is dead.

Because of the relative simplicity of procuring and segregating suitable animals and because of the decreased technical difficulties, most of the laboratories with which we are familiar have substituted the Friedman test for the Aschheim-Zondek test. In an attempt to evaluate the possibilities of the test upon the bitterling as a pregnancy test we ran 132 consecutive specimens of urine parallel to Friedman tests. In this series, cases for diagnosis in the routine conduct of several gynecologic and obstetric services were used; the results not included in this report being those in which the two tests were at variance and no final diagnosis was available. Table III shows the result of this study. The tests agreed in 84.4 per cent of the cases; the other 14.6 per cent are analyzed below.

1. Ectopic pregnancy, ruptured. Proved at operation. Test upon fish positive. Friedman test negative.

2. Intrauterine pregnancy of four months' duration. Very obese woman with malignant hypertension. Bimanual examination unsatisfactory. Test upon fish positive. Five rabbits killed by toxicity of urine. Friedman test negative.

3. Early intrauterine pregnancy seven days after the date of the first missed period. Proved by subsequent development of the pregnancy. Test upon fish positive. Friedman test negative. Subsequent Friedman test positive.

4. Missed abortion. Seven months' amenorrhea with uterus enlarged to the size of a six to eight weeks' pregnancy. Material recovered at curettage showed retained and organized placental tissue with chorionic villi. Test upon fish positive. Friedman test negative.

The mons pubis was normal in conformation and hair distribution. The skin and mucosa of the labia were normal except for the discoloration and edema incident to pregnancy. Vaginal discharge was not excessive in amount. The clitoris presented no abnormality.

The vulva was of the marital type, with thickened remnants of carunculæ hymenales. Extending downward from the vestibule in the median line was a well-developed septum, connecting the anterior and posterior commissures below and dividing the vagina into two almost equal portions, except for an aperture along its upper attachment which would admit the examining finger. As pregnancy advanced this septum shared in the general hyperplasia of the neighboring parts and was from 2.5 cm. to 3 cm. thick at its anterior and posterior attachments and from 1.5 cm. to 2 cm. in the mid-section, becoming thinner along its upper border (Fig. 1, C).

It was quite apparent that both sides of the vagina had been used for coitus, the opening upon the right being somewhat relaxed; whereas the left would admit two fingers with difficulty during the second trimester of pregnancy.

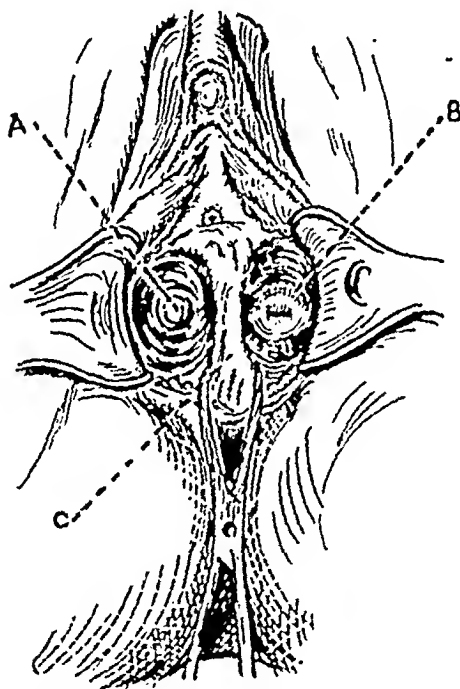


Fig. 1.—Incomplete vaginal septum complicating term pregnancy, in presence of normal fundus and single cervix.

The cervix was bulbous, of nulliparous type, discolored and presented in the left vaginal cleft (Fig. 1, B), while the right appeared almost as a blind pouch.

The fundus was slightly dextrose but presented no signs of deformity upon palpation. Early in the third trimester the fetus assumed the position of O.L.D. and remained so until the onset of labor.

Mensuration revealed the following: Interspinal diameter 26 cm., intercristate 27 cm., ext. conj. 18 cm., diagonal conjugate 19.5 cm., and transverse of outlet 8.5 cm. and suggested the moderately contracted, flat type of pelvis; and a prognosis of a complicated outlook for labor with operative indications was made.

The patient went into labor Aug. 31, 1935, and was admitted on the Obstetric Service of Provident Hospital. Progress was slow from the outset because of the contracted bony parts, deformed vaginal outlet and the time required for a rotation from left posterior position to an anterior. Pains were weak and infrequent and dilatation of the anterior lip was retarded. Near the end of the first stage it

18. Incomplete abortion. Proved on curettage and microscopic examination. Test upon fish negative. Friedman test positive.

19. Incomplete abortion. Proved on curettage and microscopic examination. Test upon fish positive. Friedman test negative.

The results of these tests bear out what was shown in the last paragraph, that the errors in any test dependent upon the estrogenic hormone are likely to be most marked in cases of early pregnancy, while errors in tests using the gonadotropic hormone as their bases are most frequent in cases in which the ovum has died (ectopic pregnancy, incomplete abortion, missed abortion, placental polyp). These findings are in accord with those of Goldberger, Salmon, and Frank¹¹ who reported 32 per cent false negative Friedman tests in a series of ectopic pregnancies.

In twenty cases followed throughout the puerperal period by testing the urine every other day it has been established that the positive test upon the urine disappears rather early. All tests were negative by the eighth postpartum day, while eight of the twenty had negative tests on the fourth day.

Table IV lists a group of forty student nurses on whose urines tests were done. The only information obtained from these girls was the date of the last menstrual period. Menstrual abnormalities, state of general health, existence of gynecologic pathology, and possibilities of endocrine derangement of one type or another were not divulged and thus the possibility for error seems great. From the results of these tests it can be seen that positive results may be obtained on the urines from nonpreg-

TABLE IV. TESTS UPON URINES FROM 40 NONPREGNANT FEMALES

DAYS FROM LAST MENSTRUATION	POSITIVE	NEGATIVE
2		1
3	1	
4	1	
6		1
8	2	
9	1	1
10	1	1
11	1	
12	1	1
14	2	2
15	1	
16	1	1
17		1
19	1	1
20	1	
22	1	1
23		2
24	1	1
25	1	
26	3	1
32	2	
33	1	
34		1
40		1
Totals	23	17

short, slightly softened, irregular, and over to the right side of the vaginal vault. The large mass felt abdominally was fixed in the pelvis and was stony hard. The diagnosis made was "solid tumor of an ovary." At operation on October 15, the mass proved to be one large fibroid arising from the cervical stump. In order to shell the fibroid out of the pelvis, an incision was made in what was taken to be the peritoneal covering of the fibroid posteriorly, way down low near the uterosacral ligaments. What was believed to be peritoneum proved to be bladder. Apparently the operator who had performed the supracervical hysterectomy had sewed the peritoneum of the bladder to the posterior surface of the cervical stump. As the fibroid grew up out of the cervix, the bladder retained its relationship and stretched upward and outward to cover completely the fibroid, not only anteriorly but also

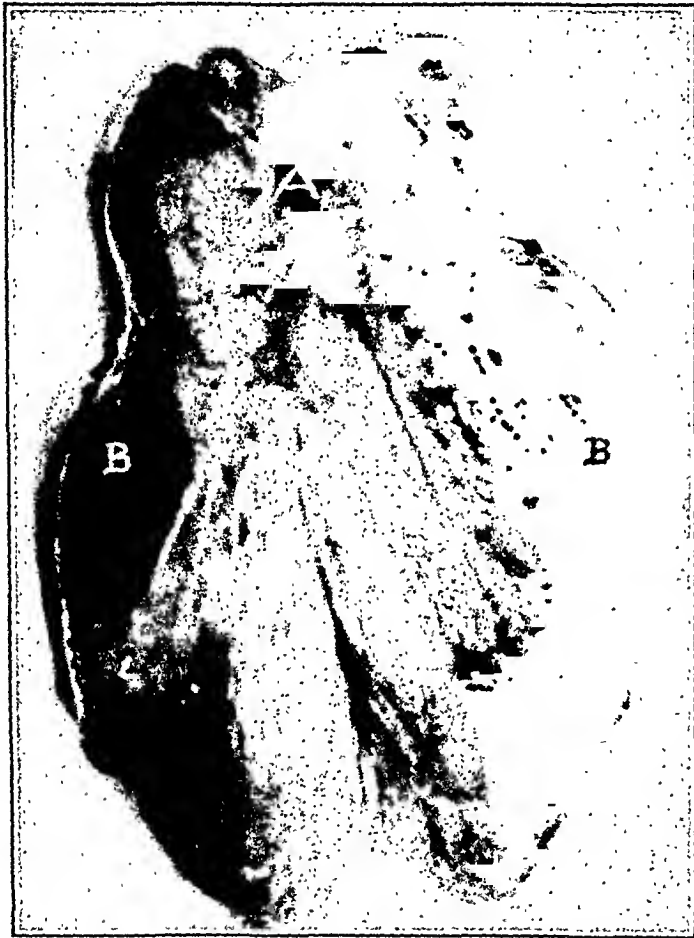


Fig. 1.—Photograph showing large cervical fibroid and small uterus on top. A, Body of uterus; B, fibroid of cervix; C, vaginal wall.

posteriorly. The rent in the bladder was easily closed. The bladder was then separated from the tumor. This was accomplished with some difficulty because of the extensive vascular connections between the bladder and the fibroid. The bladder when freed from the fibroid resembled a huge flat pouch. During the dissection, the right ureter, which was considerably distorted and dilated, was exposed on its medial aspect for quite a distance. However, since its lateral relationships were maintained, it was felt that its blood supply was ample to retain its integrity. A free piece of omentum was used to cover the exposed part of this ureter. After removal of the tumor and the cervix, a drain was placed near the exposed right ureter and another in the culdesac. The abdomen was closed as usual and a retention catheter was placed in the bladder. The fibroid measured 18 by 15 by 11 cm. (714

of boys approaching the age of puberty in order to determine at what age the exciting hormone makes its appearance in amounts that can be demonstrated and possibly gives us a means of predicting the onset of puberty.

Five patients with benign lesions of the breast (cystic mastitis) submitted urine for testing and all gave positive results. One of these is particularly interesting because this patient has had a five-year amenorrhea associated with the mammary gland hyperplasia. This is understandable when we see amenorrhea associated with the presence of theca and granulosa cell tumors of the ovary apparently based upon the production of excessive amounts of estrogenic hormone by these tumors.¹⁴ In line with this, it is of interest at this point to note that a portion of theca cell tumor weighing 1.9 gm. was extracted with ether and the extract used for testing; the test upon the bitterling was positive after forty-eight hours.

DISCUSSION

The test for estrogenic hormone using the ovipositor lengthening function of the Japanese bitterling as the criterion has proved to be of value in detecting excesses of the hormone in the urine of females associated with pregnancy, endocrine disturbances, and chronic cystic mastitis. In expecting consistent results with the minimum of error or misinterpretation we urge that only fish which had been previously standardized be used for testing. This is an extremely important factor that has been repeatedly impressed upon us in the conduct of some 1,000 tests. Without such a standardization negative tests are of no significance because we are not certain about the reactivity of the fish until we have proved that it is not refractile to the estrogenic hormone as contained in urine.

In testing with commercial hormonal products it was found that estrogenic preparations gave uniformly positive results, the amount of hormone in rat units necessary to produce a positive test varying with the various products. In all instances, preparations of the gonadotropic hormone gave negative results. Because of the many factors involved in such a study we can make no statement nor can we draw any definite conclusions as to the potency of the products tested. Variations in solubility, ingestibility, pH, purity of estrogenic substance, and side action of the "fillers" or vehicles possibly acting as factors affecting the speed or efficiency of the product in causing ovipositor elongation.

In attempting to use this reaction as a test for pregnancy, several precautions are advisedly given. It must be remembered that we do not advocate replacement of the Aschheim-Zondek or Friedman tests by this test for the diagnosis of early pregnancy because of the biologic facts that tend to show that the gonadotropic hormone excesses associated with pregnancy appear earlier than do the estrogenic principles. In our series there were two early pregnancy tests that were Friedman positive and fish negative and two that showed just the opposite findings. This is possibly explained by the fact that although the gonadotropic hormone excesses appear earlier, they do not reach a sufficient concentration in the urine to give the Type II and Type III reactions of Aschheim but merely show the follicle formation he designates as Type I reaction and which is not construed as a definite positive. On the other hand, although the

On May 7 the weight was 100 pounds, temperature 99.2° F., and the urine showed a very faint trace of albumin. By this time it was obvious that this was not a normally implanted pregnancy. The uterus had a sort of dumb-bell contour and extended almost to the umbilicus on the right side, where there were pain and tenderness. The patient was sent to Queen's Hospital for observation.

The next morning there was an increase in the size of the lower abdomen accompanied by increased pain and tenderness. The pulse was 104, temperature 98° F., respiration 24, and the R.B.C. 2,600,000 with hemoglobin of 50 per cent. The presence of internal hemorrhage was apparent and the diagnosis of interstitial pregnancy was concluded. One thousand cubic centimeters of 5 per cent glucose saline solution were given by vein. Later she was given a transfusion of 500 c.c. of citrated blood, and was operated upon.

A low midline incision was made and the abdomen was found to be filled with clots and liquid blood. It was estimated that there was about 1,000 to 1,500 c.c. of escaped blood in the peritoneal cavity.

A large mass about the size of a doubled fist was projecting from the right cornu of the uterus. It had a corrugated feel, was under tension, and there was no evidence of frank rupture. The mass was ruptured in manipulation and a four months' fetus and placenta were expelled. The right tube and ovary were of normal appearance.

A subtotal hysterectomy was done as rapidly as possible and such blood and clots as came into the field of operation were removed. The abdomen was closed without drainage; 1,000 c.c. of normal saline were given per rectum, and the patient was returned to her room. After an additional 1,000 c.c. of 10 per cent glucose were given by vein, the patient had a rather severe chill. Further convalescence was uneventful.

In this case, as in most cases of interstitial pregnancy, there was a complete amenorrhea. This amenorrhea is due to the fact that the fetus is in an environment more like that in normal pregnancy, and can therefore survive for a longer time than if it were located in the tube. The stroma of the uterine mucous membrane, because of its greater thickness, is able to form a decidua which can harbor the ovum and, at the same time, protect the muscle of the uterus from the corrosive action of the trophoblast. In the tube the connective tissue stroma is scanty and a true decidua cannot be formed, consequently the pregnancy will erode the wall and rupture earlier.

The mortality associated with interstitial pregnancy is high because of the sudden massive hemorrhage which may take place. Fortunately only 1 to 3 per cent of ectopic pregnancies are of the interstitial type.

This case is of interest because of its comparative rarity, the duration of the pregnancy and the apparent value of adrenal cortex hormone in the control of nausea and vomiting of pregnancy.

65-66 YOUNG BUILDING

Ohlin, C. A.: *The Duration of Life of Spermatozoa in the Human Fallopian Tube*, *Acta Obst. et Gynec. Scandinav.* 15: 50, 1935.

In order to determine whether the epithelium of the uterine tube and its secretions in man may have any influence upon the duration of the life of spermatozoa, Ohlin performed experiments in vitro. He compared the duration of life of spermatozoa alone with spermatozoa mixed with epithelium removed from fresh, normal, fallopian tubes. He failed to find any difference in these two groups. The results, therefore, indicate that tubal epithelium and its secretions constitute a medium which is indifferent to the vitality and longevity of spermatozoa. The author believes his experiments support the modern theory of the short life of spermatozoa.

J. P. GREENHILL.

DISCUSSION

DR. ERWIN von GRAFF, DES MOINES, IOWA.—We may expect a positive pregnancy test only in the presence of living and functioning placental tissue. In many cases of incomplete abortion and ectopic pregnancy, the test may be negative because the placenta has been separated.

In one of his charts, Dr. Bauer has cited, as failures, a number of cases of ectopic and incomplete abortion in which the bitterling test was negative. I do not agree that the test failed. The fault lay in the evaluation of the result, as a positive test was not to be expected.

DR. H. CLOSE HESSELTINE, CHICAGO, ILL.—I would like to ask some questions. First, were the extracts used for the test from male or female subjects and were the sources human? If from females, were the females pregnant? Second, what effect does drying have upon the estrogenic hormone?

DR. BAUER (closing).—The desiccated placental extracts on the market do not give positive tests, while those prepared according to Dr. Collip's method do have some effect. I cannot say whether the extracts were made from the human being or from animal material, as they were all proprietary extracts.

While we could not expect Friedman's test to be positive where the fetus has been dead for some time, it simply brings out the point that the value of the Friedman test in these conditions is not as great as we heretofore supposed. We think the bitterling test has a value which the Friedman test does not. This test is not one that can be used as a standardization process to determine a definite number of rat units. It simply tells us whether we have estrogenic hormone. If we get a positive test we have an amount of estrogenic substance comparable with that found in the urine of pregnant women at or near term.

Soimaru, A.: Generalized Peritonitis From Rupture of a Pyosalpinx, *Gynécologie* 34: 21, 1935.

Generalized peritonitis following rupture of a pyosalpinx is third in frequency in the causes of general peritonitis. The first two causes are appendicitis and gastroduodenal complications. In the author's clinic, among 179 instances of pyosalpinx there were 5 ruptures into the free peritoneal cavity, an incidence of 2.8 per cent. The ruptures are usually due to trauma or are spontaneous perforations. In the former instance the liquid forced into the peritoneal cavity is not necessarily virulent whereas in the latter it always is highly virulent. A rupture may be produced during a rough gynecologic examination, it may follow manual or instrumental manipulations on the cervix, efforts to produce abortion, unusual efforts on the part of the patient such as lifting heavy weights, after a fall, and after strenuous exercise. At the moment of rupture there is sudden intense pain followed by disappearance of the pyosalpinx. This is usually followed by tenseness of the abdominal wall. Vaginal examination will reveal exquisite tenderness of the culdesac of Douglas without the presence of a mass.

The prognosis depends upon the time of intervention, the general condition of the patient, and the simplicity of the operation. The mortality has decreased in recent years from 70 per cent to 7.6 per cent. The treatment consists of immediate operation. The author believes that simple colopotomy followed by vaginal drainage is insufficient and illegal. Likewise mere abdominovaginal drainage does not give the good results. He believes that the best treatment consists in the removal of tube and ovary followed by drainage with a Mickulicz sac. Four out of his five cases were cured by this procedure.

J. P. GREENHILL.

OBSTETRIC EFFIGIES OF THE MOUND BUILDERS OF EASTERN ARKANSAS*

S. C. DELINGER, FAYETTEVILLE, ARK., AND
ELMER G. WAKEFIELD, M.D., ROCHESTER, MINN.

*(From the Department of Zoology, University of Arkansas, and the Division of
Medicine, the Mayo Clinic)*

WE HAVE had the opportunity to study and to photograph four earthen vessels (two of them ours) which were exhumed with burial remains from the Mound Builder district of eastern Arkansas. The first of these effigies (Fig. 1) represents

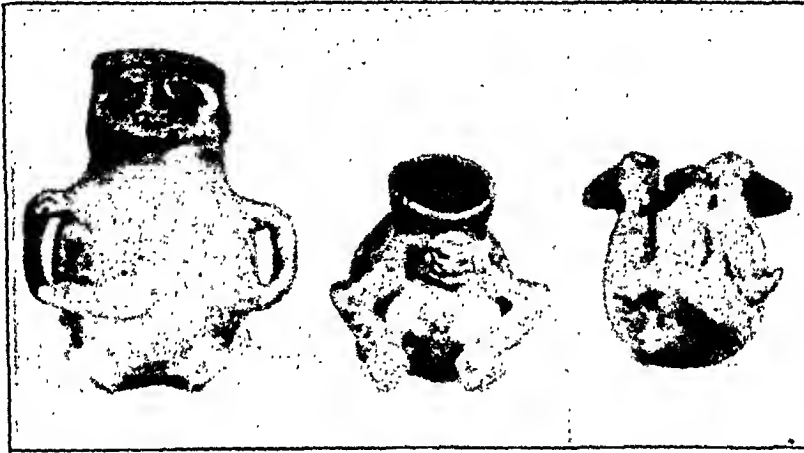


Fig. 1.

Fig. 2.

Fig. 3.



Fig. 4.

a pregnant woman, with large abdomen and prominent breasts, in the erect-kneeling posture with her own hands applied to her abdomen. The second of the effigies (Fig. 2) represents a pregnant woman, with large abdomen, in the squatting knee-

*Submitted for publication, November 11, 1925.

TABLE I. DATA ON SUBJECTS*

Subjects arranged in the chronologic order in which they were obtained. Note that the uterus did not descend below the introitus in a single subject before the beginning of an experiment. Hence, there were no cases of preexisting prolapse.

IDENTIFICATION	HOSPITAL NUMBER	AGE	PARTY	HEIGHT (CM.)	DISEASE CAUSING DEATH	TIME ELAPSED BETWEEN DEATH AND EXPERIMENT	RIGOR MORTIS	PROLAPSE PRODUCED BY ONE KILOGRAM TRACTION (RELATION TO INTROITUS)
1. F. H.	K 4495	27	2	164	Septicemia following wound of foot	2 hr. 40 min.	0	2 cm. plus
2. N. B.	K 5687	53	5	166	Cardiac failure	4 hr. 45 min.	0	0
3. C. H.	K 8081	51	5	160	Stenosis common bile duct. Postoperative pneumonia	4 hr. 30 min.	4-plus	2 cm. plus
4. L. A.	K 8026	47	7	157	Bronchopneumonia	5 hr. 25 min.	1-plus	1 cm. plus
5. M. J.	K 8586	34	5	168	Septicemia following leg ulcer. Terminal pneumonia	4 hr. 0 min.	0	1 cm. plus
6. L. K.	K 11090	41	8	157	Chronic diffuse nephritis with uremia	8 hr. 16 min.	4-plus	0
7. F. A.	K 7607	19	0	160	Shock following lobectomy for bronchiectasis	3 hr. 45 min.	0	4 cm. plus
8. M. F.	K 11774	24	0	170	Sudden death 45 minutes after tonsillectomy	4 hr. 30 min.	1-plus	2 cm. plus

* Arranged in order in which subjects were obtained.

lacerations; otherwise appeared normal to ocular inspection. Uterus, normal in size, position, and motility; consistence normal. Fornices, adnexa palpable but not tender; culdesac clear.

Extremities: No adenopathy.

Admission diagnosis: Vaginal ulceration of tuberculous or syphilitic origin.

X-ray: Chest, no pleural or pulmonary pathology. Gastrointestinal tract, no intrinsic lesion of stomach or first part of duodenum; normal gastric motility after six hours. Barium enema, cecum and terminal ileum normal; appendix visualized and appeared to be normal; colon, no intrinsic lesion.

Cystoscopy examination: Examination of the bladder entirely negative. Pyelograms normal throughout. Bladder urine culture showed gas and gram-negative bacilli resembling *B. coli*. Kidneys (R. & L.) 2 or 3 white and red blood cells per high-power field; culture sterile; Pappenheim's stain on centrifuged sediments of bladder and kidneys showed no acid-fast bacilli.

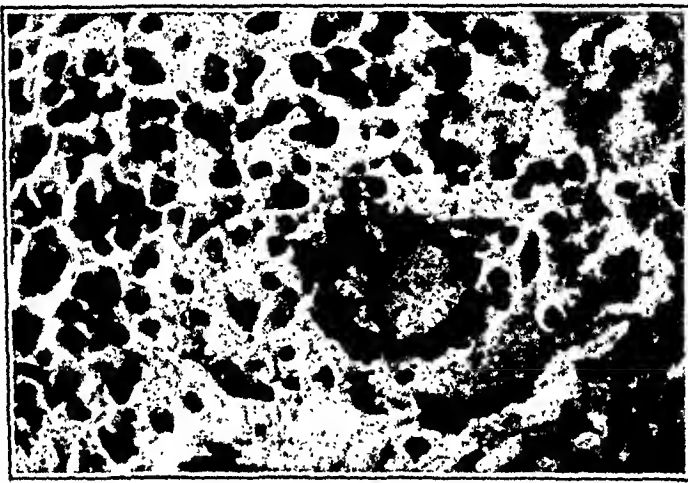


Fig. 1.

Guinea pig inoculation of urine was negative.

Biopsy specimen taken from the edge of one of the ulcerating areas in the vagina showed an area of ulceration; mucosa was replaced by cellular exudate consisting of small, round, and plasma cells; in the submucous tissue there were more or less isolated nodules composed of small, round, and endothelial cells; several of these contained typical Langerhans' giant cells suggesting that the process was of tuberculous character. Diagnosis: Tuberculosis of the vagina.

The patient was discharged May 4, 1935, and instructed to take douches of sodium bicarbonate (one tablespoonful to a quart of hot water) daily. On Sept. 24, 1935, the granulating areas had gradually epithelialized and were completely healed, being replaced by fibrous tissue; her pelvic examination was the same as previously described. Her complaints of dyspareunia and vaginal discharge had been corrected but moderate menorrhagia still existed.

pelvic, and the upper portion of the broad ligaments hardly affected the position of the uterus in the pelvis. In three cadavers in which all parametrial and paravaginal tissues were severed, but the round ligaments were left intact, the cervix prolapsed through the introitus without even tensing the round ligaments. Because of the laxness and extensibility of these ligaments it is difficult to see how they can possibly affect the position of the fundus. Hence from an anatomic standpoint the fundus of the uterus is a movable organ. This view is held by Halban and Tandler,⁴ who feel that because of this mobility it is impossible to speak of a definite uterine position.

The uterosacral ligaments furnished a small amount of support, which may be explained by the fact that they are so closely connected anatomically to the parametrial tissues. The so-called pubocervical ligaments played a negligible rôle.

The pelvic diaphragm and the pelvic floor remained intact in all eight cadavers and in no instance interfered with uterine descent. Since the integrity of the pelvic floor was not interfered with in any of the experiments and since in every case traction of 1 kg. effected complete uterine descent after all uterine connective structures were divided, it is doubtful whether the pelvic floor affords any support to the uterus. Even in Subject 8, a virgin, the uterus prolapsed completely when the paravaginal and parametrial tissues were cut.

Division of the parametrial and paravaginal tissues, comprising the lower two-thirds of the broad ligament and the upper two-thirds of the paravaginal structures, allowed an average uterine descent of 10.5 cm. *Marked descent of the uterus amounting to actual prolapse never occurred so long as any part of the upper two-thirds of the paravaginal and/or lower two-thirds of the parametrial tissues were intact.* In three instances all of the structures above the vagina were severed, so that the sole support of the uterus was its attachment to the vagina, and in one of these instances only 1 cm. of the circumference of the vaginal wall remained attached to the otherwise completely free uterus. Nevertheless, noticeable descent did not occur. In two of these three cadavers dissection of the paravaginal tissues was carried out from above downward. In each instance, as the vagina was freed it inverted, and progressive prolapse to complete vaginal inversion followed. In two instances in which the vagina was circumcised at its cervical attachment and the parametrial tissues were allowed to remain intact, no descent of the uterus occurred.

The abdominal cavity may be thought of as a bucket, to a hole (vulva) in the floor of which a flexible tube extending upward (vagina) is attached. If the bucket were filled with oysters, or some similar semifluid material, it is obvious that the flexible tube would immediately turn inside out like the finger of a rubber glove, but if this tube were fixed by fibrous bands (paravaginal tissues) to the side walls of the bucket, it would necessarily remain in place. The perineal musculature is merely the bottom of the bucket, and is therefore unable to support anything except the external end of the vagina.

DISCUSSION

Mackenrodt⁷ felt that the parametrial and paravaginal tissues were the primary supports of the uterus and noted that "... the pelvic fascia sends out firm bands to the cervix uteri and the vagina, holding and fixing them"

Fothergill² also recognized the importance of the tissues investing the vagina and the lower part of the uterus, though his attention was concentrated on the parametrial tissues. The reasons for his opinion are admirably given, as follows: "To the clinical observer, the nature of these real supports is revealed by the operation

American Journal of Obstetrics and Gynecology

EDITORS: GEORGE W. KOSMAK, M.D., AND HEGO EHRENFEST, M.D.

Editorial Comment

Anemia in Pregnancy

ALTHOUGH almost a full century has passed since Walter Channing of Boston first described anemia in pregnancy, prior to the last ten years the progress of knowledge was essentially limited to descriptive and nosologic studies of this condition. Investigators were, for the most part, so thoroughly imbued with the belief in a positive etiologic agent, a *materics morbi*, that an untold amount of time and energy was devoted to the search for the hypothetic toxin which, elaborated by the product of conception, resulted in the development of anemia. The introduction of liver therapy in pernicious anemia a decade ago by Minot ushered in a virtual renaissance of fruitful research in the field of hematology. The work of Whipple, Minot, Castle, and their various associates established in a quantitative way the relationship of food, digestion, and absorption to blood formation. It therefore became obvious that the best method of attacking the problem of anemia in pregnancy would be by the study of these factors in pregnant women.

Early observers had demonstrated that there were different types of anemia in pregnancy, many of them dependent on well-established causes for anemia, such as hemorrhage, sepsis, nephritis, and the like. Two distinct types, however, remained associated with no obvious cause. One of these was morphologically similar to addisonian pernicious anemia, the other to simple hypochromic anemia. In 1928 there was recorded the first successful treatment of a case of pernicious anemia of pregnancy with liver by Deschamps and Froyez. Two years later an unequivocal demonstration of the successful treatment of hypochromic anemia of pregnancy with iron in adequate dosage was published by Strauss. Following these reports many investigators have established beyond question that in the absence of complications, pernicious anemia of pregnancy may be relieved by liver therapy and hypochromic anemia of pregnancy by iron therapy, *provided that in each instance an adequate amount of liver or iron be employed*. It has been shown that the mere administration of *some liver* or *some iron* is not sufficient. Enough

levator diaphragm as high as the supravaginal cervix, are inserted into the fascia covering the side walls of the pelvis along the lines of attachment of the levatores ani muscle." These parametrial and paravaginal tissues are well shown in a schematic coronal section of the

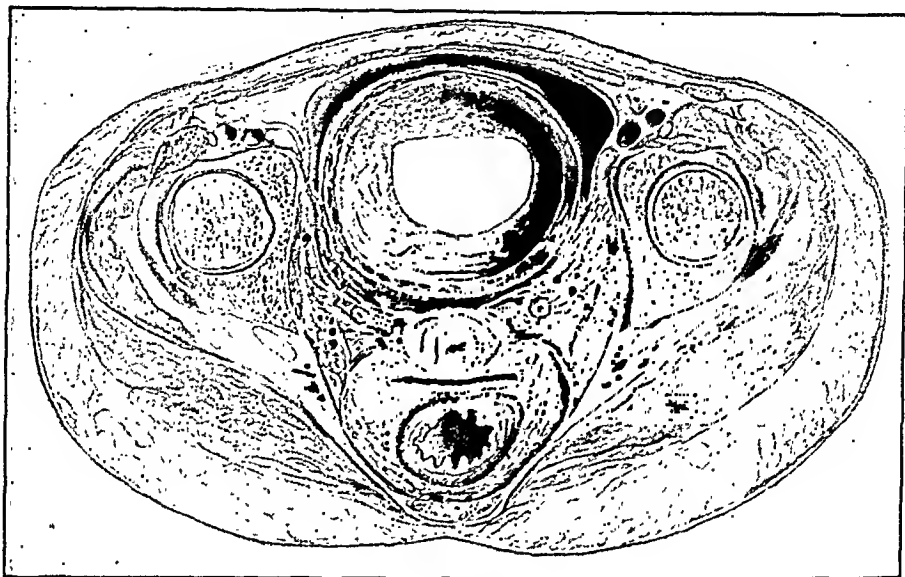


Fig. 2.—Original drawing from cross-section of female cadaver in the Department of Anatomy. Note how the paracervical tissues extend and expand laterally to the pelvic diaphragm. The ureter and pelvic vessels may be seen in this tissue. The exact level of the section may be determined by noting the peritoneum of the bottom of the pouch of Douglas between cervix and rectum.

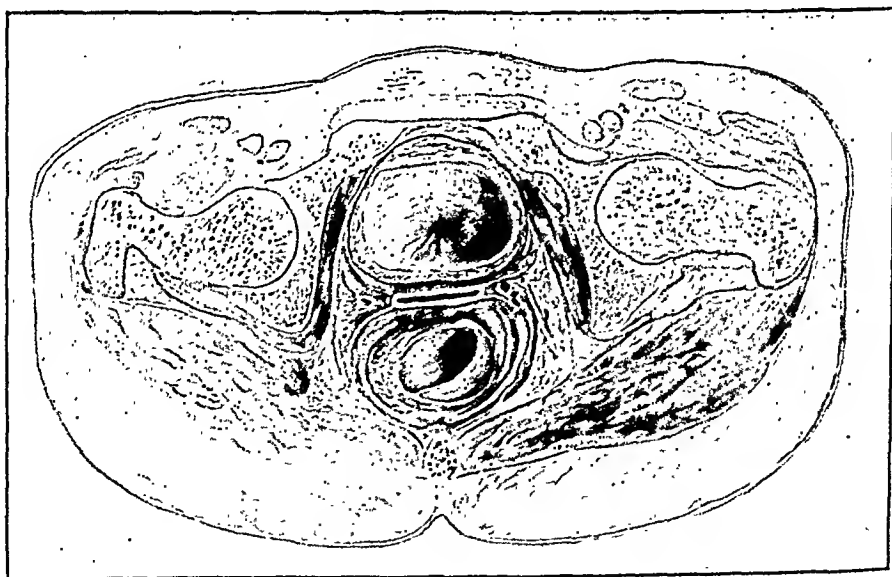


Fig. 3.—Original drawing from cross-section of female cadaver in the Department of Anatomy. Note how the paravaginal tissues are thinner and do not extend laterally as far as they do in Fig. 2 because the pelvic diaphragm is becoming narrower at this point. This will be more readily understood by comparing with Fig. 1, the coronal section.

female pelvis (Fig. 1), and also in cross-section (Figs. 2 and 3). It will be seen that they surround the vagina and fill in all of the space medial to the muscles of the pelvic diaphragm.

fare to note that the daily administration of as little as 0.5 gm. (7½ gr.) of ferrous sulphate to women during the last four months of gestation has prevented the development of hypochromic anemia in a large series of cases in spite of the fact that most of these women partook of diets which were considered inadequate. One of every four women of a control, untreated group of pregnant women developed hypochromic anemia with less than 70 per cent hemoglobin.

The conclusions that may be drawn from the studies that have been outlined are of practical significance. Anemias occur in pregnancy, not as a result of mysterious hypothetic toxins but from the same types of mechanism as produce similar anemias in the nonpregnant. The treatment must thus be, not the termination of pregnancy, but the exhibition of the proper, *proved*, therapeutic agents. Hypochromic anemia in pregnancy is to be prevented by the use of some simple iron salt, in adequate amount, and the employment of diets containing adequate amounts of blood-building materials.

In Memoriam

WILLIAM BLAIR-BELL

IT IS with deep sorrow that we record the death, at the age of 65, on January 25, of Professor Blair-Bell, the distinguished English gynecologist, author, editor, and research worker. He was well known in this country and was made an honorary member of the American Gynecological Society in 1923 after having been its official guest speaker at the annual meeting in 1922. Professor Blair-Bell made numerous outstanding contributions to the literature of his specialty, but his chief efforts were devoted to two problems—the physiology of the ductless glands and the treatment of cancer by chemical agents. His American colleagues may well acknowledge Blair-Bell's genius, a man to whom they owe tribute for the monumental services which make his eventful career an outstanding one in Anglo-American medicine.

5. Marked descent of the uterus amounting to actual prolapse never occurred so long as any part of the upper two-thirds of the paravaginal and/or lower two-thirds of the parametrial tissues were intact. Of these two arbitrary divisions of the urogenital fascia propria, the paravaginal tissue seemed to be slightly more important, for its division allowed an average uterine descent of 6.9 cm. as compared with 3.6 cm. following division of the parametrial tissues.

Acknowledgments: This study could not have been carried to a conclusion without the generous cooperation of the Department of Pathology and especially of its Head, Dr. H. P. Smith. The drawing of the coronal section of the pelvis was kindly prepared by Dr. E. W. Sehldrup of the Department of Anatomy.

REFERENCES

- (1) *Bonney, Victor:* J. Obst. & Gynec. Brit. Emp. 41: 669, 1934. (2) *Fothergill, W. E.:* Proc. Roy. Soc. Med. 1: Pt. 2; Obst. & Gynaec. Sec. p. 43, 1908. (3) *Goff, Byron H.:* Surg. Gynec. Obst. 52: 32, 1931. (4) *Halban, Josef, and Tandler, Julius:* Anatomie und Aetologie der Genitalprolapse beim Weibe. Wilhelm Braumüller, 1907, Wien und Leipzig. (5) *Koster, Harry:* AM. J. OBST. & GYNEC. 25: 67, 1932. (6) *Legendre and Bastien:* Bull. et mém Soc. de chir. de Paris 9: 417, 455, and 457, 1858-9. (7) *Mackenrodt, A.:* Arch. f. Gynäk. 48: 392, 1895. (8) *Prentiss, H. J.:* Personal communication. (9) *Spalding, Alfred Baker:* AM. J. OBST. & GYNEC. 12: 655, 1926.

A SYNDROME SUGGESTIVE OF ESTROGENIC DEFICIENCY*

A CLINICAL STUDY

PHILIP F. SCHNEIDER, M.D., F.A.C.S., EVANSTON, ILL.

(Department of Obstetrics and Gynecology, University of Illinois School of Medicine)

DETAILED clinical study of a group of patients nineteen to eighty-one years of age who presented themselves with various types of menstrual or reproductive disturbances revealed a large group of subjective symptoms which were very similar in each instance regardless of the menstrual abnormality of which the patients complained. The symptoms were characteristic of those occurring in association with the menopause, and although present in the greatest number and with the greatest severity in the menopausal patients, were also encountered in the younger group of women in association with other menstrual and reproductive disturbances.

The above observations in addition to the uniformly excellent results which have been obtained in the relief of the same symptoms in association with the menopause¹ served as the basis for considering their presence whenever encountered as indicative of estrogenic deficiency and the attempt to correct them by means of estrogenic therapy.

*Read at the Seventh Annual Meeting of the Central Association of Obstetricians and Gynecologists, held at Omaha, Neb., October 10 to 12, 1935.

SPECIAL ARTICLE

AMERICAN BOARD OF OBSTETRICS AND GYNECOLOGY

SURVEY OF OBSTETRIC AND GYNECOLOGIC OPPORTUNITIES IN 89 HOSPITALS IN THE UNITED STATES AND 12 HOSPITALS IN CANADA, 1935

THE American Board of Obstetrics and Gynecology, as well as the other certifying boards for the various specialties, have recognized that certain fundamental training is necessary in the development of specialists in obstetrics and/or gynecology. The importance of graduate work in medicine is coming to be recognized by numerous agencies, including the Council on Medical Education of the A.M.A.

In 1932 the report on Obstetric Education of the White House Conference on Child Health and Protection was published. Consideration was given to graduate education and some quotations may be pertinent.

"Graduate work is quite different, having rather definite and well understood meaning in other fields of education. Most universities have graduate schools where advanced students can do intensive, specialized and original work which leads to the granting of an advanced degree. A few medical schools have undertaken to conduct a graduate school of this type, with the granting of a master's or a doctor of philosophy degree after two or three years of training. Other schools do real graduate work and offer fine opportunities without the establishment of a graduate school of medicine and without granting a degree. Whether or not a degree is granted does not seem to be essential, but there is a definite difference in the character of the opportunities offered and in the type of education and training required, and this constitutes the real difference between so-called postgraduate and graduate training and education."

"It is essential that teachers, investigators and well qualified specialists be continually trained in obstetrics. This can be done best by serious graduate work, which would take anywhere from four to ten years after graduation. The termination of this period of education and training would, of course, not be final, and the man would naturally continue to learn and improve. The best type of physician never completes his education. He is always moving forward."

Students are gradually demanding and securing longer courses of informal and formal education in their chosen fields of medicine, but those who have failed to secure this training often have difficulty in orienting themselves. Many recent graduates do not know where to seek these opportunities. The American Board of Obstetrics and Gynecology realized some of the difficulties which prospective applicants for certification encountered in meeting the following established requirements:

Group A. Those who have limited their practice to obstetrics and/or gynecology for a period of ten years or more, having had adequate special training.

Group B. Those who have had: (1) at least one year of interne service; (2) five years or more of practice thereafter, including at least three years of special training in obstetrics and/or gynecology satisfactory to the Board of Directors; (3) and who are now limiting their practice to obstetrics and/or gynecology.

*Obstetric Education Report of the Subcommittee on Obstetric Teaching and Education, p. 8. The Century Company, New York and London, 1932.

†Ibid, p. 10.

The symptoms consisted principally of prodromal exhaustion, nervousness, irritability, emotional instability, cramping, tenderness of the breasts; with leg ache, backache, and headache occurring in the more severe types.

Type II. Parous.—The history of estrogenic deficiency usually dated back to previous pregnancies but frequently indications were obtained that the deficiency had existed since adolescence. The symptoms were usually not of a severe type.

Type III. Postpartum.—These patients presented the typical clinical picture frequently encountered within six or eight weeks following delivery, with extreme emotional instability, exhaustion, nervousness, and usually giving a history of an exceptional feeling of well-being during pregnancy.

Type IV. Sterility.—There were ten primary and two secondary sterilities. Many of these patients had been under treatment over considerable periods of time before glandular therapy was started. Tubal occlusions, aspermia, and the other usual causes of sterility had been eliminated. The symptoms exhibited were mostly prodromal and in almost every instance dated back to adolescence. Uterine hypoplasia was frequently an accompanying condition. In only two of these patients were the symptoms of the severe type.

Type V. Menopausal.—Nine of these menopausal cases were spontaneous, 4 were due to irradiation and x-ray therapy, and 5 resulted from surgical removal of the ovaries. The symptoms were in most instances of the severe type. This was particularly true of the surgical and x-ray radium group and of those cases in which symptoms of estrogenic deficiency had been present for long periods of time prior to cessation of the menses.²

Further classification according to the severity of symptoms:

- Group I. *Mild.* Mild prodromal symptoms only, 28 cases.
- Group II. *Moderately severe.* Prodromal symptoms. Some symptoms present throughout cycle, 36 cases.
- Group III. *Severe.* Severe prodromal and constant symptoms, 17 cases.
- Group IV. *Exaggerated.* Extreme and constant symptoms, 4 cases.

ESTROGENIC SUBSTANCES USED

The materials used in this study consisted of an oral and a parenteral preparation of estrogenic substance. The oral preparation "Emmenin" (Collip³) is obtained from the human placenta and according to Collip³ "comes nearer to being a physiologically active substance than the crystalline compounds ketohydroxy (theelin) and trihydroxy (theelol) estrin." Collip has suggested the possibility that emmenin is produced in the human placenta as the parent estrogenic substance and that the crystalline products "theelin" and "theelol" may be regarded as the end-products of metabolism. Bauer, Kantor and Klawans⁴ have demonstrated that the response in bringing down the ovipositor of the Japanese bitterling of emmenin (Collip) and progynon (Schering) was greater per unit used than the reaction produced by the more refined crystalline products di-tri and ketohydroxy estrins. For parenteral administration, amniotin in oil, 8,000 I.U. per 1 c.c. (Squibb⁵), was used

²The large amounts of emmenin supplied by Ayerst, McKenna & Harrison, Ltd., and preliminary amounts of amniotin supplied by E. R. Squibb & Sons have made this study possible and are greatly appreciated.

Residencies

Are appointments only by promotion?

Signed

Position

Hospital

City and State

AMERICAN BOARD OF OBSTETRICS AND GYNECOLOGY

Office of Secretary

1015 Highland Building, Pittsburgh, (6) Pa.

This Board is now making a check of the material collected in the course of its survey of graduate training facilities in obstetrics and gynecology in the United States and Canada.

Will you please carefully look over the information given below for your Hospital, check it if accurate, correct it in the case of error, and fill in any missing portions. (We have used pencil in order to facilitate your corrections.) We are making an effort to get these data assembled and in pamphlet form by this Fall, and shall greatly appreciate your prompt return of this sheet.

PAUL TITUS, *Secretary.*

Hospital

Chief of Service

*Diplomate, Am. Brd. Obst. & Gyn.

Candidates should apply to

Appointments made

LENGTH SERVICE	SERVICE BEGINS	NO. OF OB. AND GYN. APPTS.	SALARY	MAIN- TENANCE	PREVIOUS INTERNE- SHIP	APPTS. ONLY BY PRO- MOTION?	COMMENT

No. of ob. & gyn. patients last year (estimated): Ob..... Gyn.....

No. of beds: Obstetric..... Gynecologic..... Total.....

Signed

Position

Hospital

City and State

others in the treatment of involutinal states and by the realization that conditions encountered in this series differ from the actual menopausal conditions only in degree of estrogenic deficiency.

RESULTS

Twenty-eight cases classified as *mild* in Group I were relieved of symptoms by oral therapy only, and it was found possible to maintain freedom from symptoms with gradually decreasing amounts.

In the 36 *moderately severe* cases in Group II, the same results were obtained by addition of parenteral administration varying from 1 to 10 injections of amniotin in oil. In this series also it has been possible to maintain freedom from symptoms by means of the oral preparation emmenin after the initial relief has been obtained.

In Group III, in 17 cases classified as *severe*, similar results were obtained, the only difference being that results were not obtained as promptly, larger amounts of parenteral therapy were necessary, and remissions occurred more frequently before oral therapy became adequate. The parenteral therapy in some instances amounted to 32,000 I.U. daily.

In Group IV, in the 4 cases of the *exaggerated* type, incomplete results were obtained and these four cases were listed as the only failures in the series. In two cases the treatment was discontinued before sufficient therapy had been administered, which may have been the cause of failure. One of the remaining two cases was found to have an adrenal deficiency and is at present being treated by combined estrogenic and adrenal therapy. The other failure was found to have an accompanying thyroid deficiency as manifested by a basal metabolism rate of -19 and cholesterol of 200, although subsequent therapy has not been started.

It is of interest that as associated conditions, acne occurred in 5 patients, arthritis in 19, and colitis in 15, and in every instance where the subjective symptoms were relieved and the treatment continued, all of these associated symptoms disappeared usually within a few days or weeks. In the group of sterility patients, 4 of 12 have become pregnant after from three to six months of therapy. These patients have not as yet completed the pregnancy and will be reported at a later date.

In no instance has it been necessary to resort to additional treatment for dysmenorrhea, menorrhagia, metrorrhagia, or the secondary amenorrheas. Whenever encountered they were either corrected or improved to the extent that they were rendered negligible. Although not encountered in this series, other pelvic pathology must be considered in the presence of the above symptoms before estrogenic therapy is instituted.

Massive doses of amniotin have been administered in amounts up to 72,000 I.U. daily in the patients with the extreme symptoms of estrogenic deficiency without the production of bleeding or other visible ill effects. This would undoubtedly not be true if attempted in patients

San Francisco Hospital, San Francisco, Calif.	W. G. Moore* A. V. Pettit* K. L. Schaupp	Dean, U. of Calif., or Dean, Stanford U.	Ob. 1553 Gyn. 1013	Ob. 56 Gyn. 63	House Officer	1 yr.	July 1	1	\$ 50	Yes	Rotating incl. 4 mo. Ob. and Gyn., rest Genl. and Ortho. Surg.
Stanford University Hospital, San Francisco, Calif.	Dr. Ludwig Emge*	Director of the Hosp. or Chief of Staff	Ob. 619 Gyn. 685	Ob. 25 Gyn. 101	Dec. or Jan., closing Dec. 1	1 yr.	July 1	2	\$ 75	Yes	
University of California Hospital, San Francisco, Calif.	Dr. F. W. Lynch*	Dean's office, U. of Calif. Med. Center	Ob. 545 Gyn. 580	Ob. 24 Gyn. 29	February (Apply before Jan. 1)	1 yr.	June 1	3	None	Yes No	Rotating service incl. 6 mo. ea. on Ob. and Gyn.
Santa Clara County Hospital, San Jose, Calif.	Dr. A. A. Shufelt*	Dr. Doxey R. Wilson	Ob. 741 Gyn. 349	Ob. 24 Gyn. 2	Jan. 15	1 yr.	July 1	9	\$ 25	Yes	Rotating service incl. 6 wk. ea. Ob. and Gyn.
New Haven Hospital, New Haven, Conn.	Dr. A. H. Morse*		Ob. 436 plus OPD Gyn. 447	Ob. 20 Gyn. 26		20 mo.	March, July, Nov.	6	None	Yes No	Rotating service incl. 8 wk. ea. Ob. and Gyn.
						6 mo.	July and Jan.	4	Yes	Yes Yes	Combined Ob. and Gyn.
						1 yr.	July	1	Yes	Yes Yes	Ranks as Jr. Instructor in Med. School

CONCLUSIONS

1. A syndrome composed of subjective symptoms is presented which occurs not only in association with the menopause but also accompanying menstrual and reproductive disturbances in young women.

2. The correction of these symptoms in a large proportion of 85 patients by the oral and parenteral administration of estrogenic substances indicates that this syndrome is strongly suggestive of estrogenic deficiency.

3. In many of the patients in this series, dysmenorrhea, secondary amenorrhea, menorrhagia, metrorrhagia, and sterility have responded to estrogenic therapy.

4. When relief of subjective symptoms was used as a criterion for the amount of estrogenic therapy necessary, no evidence of permanent harmful effects of massive dosage was observed.

5. The excellent results obtained by the administration of an active oral estrogenic substance and the added difficulties and economic factors involved when parenteral therapy is necessary, emphasize the need for an oral estrogenic preparation of greatly increased concentration and potency, not to replace the preparations now available, but to be used as an adjunct wherever necessary.

REFERENCES

(1) *Severinghaus, E. L.*: J. A. M. A. 104: 624, 1935. (2) *Idem.* (3) *Collip, J. B.*: International Clinics 4: Series 42, 51, 1932. (4) *Bauer, Kantor and Klawans*: Personal communication. (5) *Biskaind, M. S.*: J. A. M. A. 105: 667, 1935. (6) Same as (1) and (2). (7) *Smith, G. V., and Smith, O. W.*: J. A. M. A. Trans. Sect. Obst. & Gynec., p. 189, 1931.

636 CHURCH STREET

DISCUSSION

DR. LAWRENCE RANDALL, ROCHESTER, MINN.—There are two groups of patients with evidence of disturbance in the physiology of the genital tract, those who have associated symptoms and those who do not. The majority of the former have laboratory evidence of pituitary hyperfunction with or without definite proof of lack of estrin. The second group does not show evidence of excess pituitary function, but usually has evidence of pituitary failure and an absence of estrin.

The chief example of the first group is the woman in the menopause. The familiar symptoms are present, estrin may still be detected in the blood and urine, but the Aschheim-Zondek prolan test is positive. The best example of the second group is the amenorrheic but otherwise healthy and symptomless young woman. She will usually be found to have no evidence of either prolan or estrin in the blood or urine and to have an atrophic uterus. I would therefore regard the syndrome described by Dr. Schneider as one suggesting pituitary hyperfunction, rather than one suggesting estrogenic deficiency.

We have seen instances of women with fifteen rat units of estrin per liter of urine, who had a positive Aschheim-Zondek prolan and who had symptoms in general similar to those that Dr. Schneider mentions. On the other hand, in a primary pituitary failure with no evidence of prolan or estrin, these symptoms are rarely, if ever, seen.

University Hos- pital, Au- gusta, Ga.	Obstetrics Dr. Joseph Ak- erman <i>Gynecology</i> Dr. W. H. Goodrich	Supt. of Hospital	Nov.	Ob. 1201 <i>Gyn.</i> 2851 ²	4	Internes	1 yr.	July 1	10	\$ 10 with \$5 bonus	Yes	No	Rotating serv- ice incl. 6 wk. ea. Ob. and Gyn.
Chicago Lying- In Hospital, Chicago, Ill.	Dr. F. L. Adair*	Dr. Adair	Internes: Jan., Apr., July and Oct. 1 Resi- dents: Jan. and July 1	Ob. 3398 <i>Gyn.</i> 597 150 12		Internes Residents	1 yr. 9 mo.	July 1 Ob. 1 July 1 Ob. 20 qtrly.; Gyn. 2 Jan. & July 1	Ob. 1 Ob. 1 None	\$ 50 \$100 None	Yes Yes Yes	Yes Yes Yes	Straight service
Chicago Mater- nity Center, Chicago, Ill.	Obstetrics Dr. J. B. De- Lee*					Residents	3 yr.	Jan. and July 1	6	\$33.33 to \$75	Yes	Yes	Rotating serv- ice incl. 3 mo. on Ob.
Cook County Hospital, Chicago, Ill.	Obstetrics Dr. D. S. Hillis <i>Gynecology</i> Dr. F. H. Falls*	Warden of the Hospital	Jan. 1 and July 1	Ob. 4200 <i>Gyn.</i> 2450 200 100		Internes Residents	18 mo. 1 yr.	Jan. 1 and July 1		None	Yes		Rotating serv- ice incl. some time on Ob. and Gyn.
Passavant Me- morial Hos- pital, Chi- cago, Ill.	Dr. A. H. Curtis*	Director of In- ternes		Ob. 551 <i>Gyn.</i> 503 26 39		Internes Residents	1 yr. Ob. 6 mo. Gyn. 1 yr.	Ob. 1 every Jan. 1 and 6 mo. July 1 Gyn. 1 Gyn. July 1	Ob. 1 None	None	Yes Yes	Yes No	2 mo. ea. Ob. and Gyn.

times in the menstrual cycle that is not entirely like some of the estrogenic products. It takes only 45 units of emmenin, while it takes 450 rat units of follicular hormone, to produce a reaction in the bitterling.

If the gonadotropic principle in urine is destroyed by boiling, an estrogenic principle remains which represents all the elements present in the human pregnancy urine. If one purifies the hormone it eliminates the substance which may possibly relieve the symptoms. This is the reason we get failures with some preparations and good results with others.

DR. SCHNEIDER (closing).—The fact that our results in the treatment of the involutional states have been greatly improved with the use of more potent materials and greater dosages is I think an indication that the treatment is not entirely psychic. I should like to emphasize that more consistent results may be obtained in dysmenorrhea, amenorrhea, menorrhagia, and metrorrhagia, by the treatment of the subjective symptoms with estrogenic substances than according to our experience is possible with anterior pituitary and anterior pituitary-like substances.

The question which has been raised as to the possibility of placental extracts containing some of the gonadotropic factors probably does not apply to the preparation "emmenin" due to the fact that the gonadotropic factors can be removed by boiling.

Further evidence that estrogenic deficiency is a basis for these symptoms is that many of our patients give a history of a feeling of well-being during pregnancy when large amounts of estrin are produced by the placenta.

THE EFFECTS OF X-RAY AND RADIUM ON CANCER OF THE CERVIX*

EUGENE S. AUER, M.D., DENVER, COLO.

(From the Gynecologic Service of the Barnard Free Skin and Cancer Hospital)

IN 1930 a new routine in the radiation treatment of cancer of the cervix was adopted on the Gynecological Service of the Barnard Free Skin and Cancer Hospital in charge of Drs. G. Gellhorn and F. J. Taussig. Prior to this, external irradiation with roentgen rays was used only occasionally after radium therapy. Radium was used in dosages of 4,500 mg. hours or less, the filtration consisting of a maximum of 1 mm. brass, and a minimum of bare steel needles. When this study was started, external irradiation with roentgen rays was given each patient, the radium applied three weeks following the roentgen therapy in one massive dose of from 4,500-6,000 mg. hours, and the filtration changed to heavy gold having a density equivalent to 1.2 mm. platinum. As a rule 150 mg. of radium were used divided between cervical canal and uterine cavity, but not evenly. At times smaller amounts of radium used over longer periods of time were used to give the desired dosage. Toward the end of this study the 150 mg. of radium were divided into four portions, one part being placed in the uterine cavity, one part into the cervical

*Read at the Seventh Annual Meeting of the Central Association of Obstetricians and Gynecologists, held at Omaha, Neb., October 10 to 12, 1935.

University of Kansas Hos- pital, Kansas City, Kan.	Dr. L. A. Cal- kins*	Dr. Calkins	Dec. 1	Ob. 1000 Gyn. 600	Ob. and Gyn. 42	Internes	1 yr.	July 1	\$ 15	Yes	No	Rotating serv- ice incl. 6 wk. ea. Ob. and Gyn.
University of Kansas Hos- pital, Kansas City, Kan.	Dr. L. A. Cal- kins*	Dr. Calkins	Dec. 1	Ob. 1000 Gyn. 600	Ob. and Gyn. 42	Internes	1 yr.	July 1	\$ 15	Yes	No	Rotating serv- ice incl. 6 wk. ea. Ob. and Gyn.
						Junior Residents	1 yr.	July 1	1 \$ 50	Yes	Yes	
						Asst. Res.	1 yr.	July 1	1 \$ 75	Par- tial	Yes	
						Residents	1 yr.	July 1	1 \$ 100	Yes	Yes	
						Internes	1 yr.	July 1	2 \$ 25	Yes	2 yr. rotat- ing	
Charity Hospi- tal, New Or- leans, La.		Supt.	April, May or June	Ob. Gyn.	Ob. Gyn.	Junior Fellow	1 yr.	July 1	2 \$ 50	Yes	Yes	Yes
						Senior Fellow	1 yr.	July 1	2 \$ 50	Yes	Yes	
						Internes- Residents	1 yr.	July 1	\$ 10	Yes	No	Residents al- ternate in Gyn. & Ob. ev- ery 6 mo.
Touro Infirmary, New Orleans, La.	Obstetrics Dr. W. E. Levy* Gynecology Dr. C. J. Mil- ler*	"	Early in Jan.	Ob. 996 Gyn. 1002	Ob. 416 Gyn. 666	Internes	1 yr.	July 1	\$ 10	Yes	No	Residents al- ternate in Gyn. & Ob. ev- ery 6 mo.
						Residents	1 yr.	July 1	2 \$ 25	Yes	Yes	Pre- ferred
						Internes	1 yr.	Sept. 1	Ob. 5 Gyn. 4	Yes	No	Nonrotating service
						Asst. Res.	3 yr.	Sept. 1	Ob. 2 \$ 20 Gyn. 1	Yes	Re- quired	Yes
Johns Hopkins Hospital, Baltimore, Md.	Obstetrics Dr. J. McF. Bergland* Gynecology Dr. T. S. Cullen	Director of the Hospital	Jan. 1	Ob. 1708 Gyn. 1238	Ob. 58 Gyn. 46	Residents	1 yr.	Sept. 1	Ob. 1 Gyn. 1	Re- quired	Yes	Yes
						Internes	1 yr.	July 1	1 None	Yes	No	Genl. rotating
						Asst. Res.	1 yr.	July 1	1 \$ 25	Yes	Yes	
						Residents	1 yr.	July 1	1 \$ 50			Yes
Mercy Hospi- tal, Balti- more, Md.	Obstetrics Dr. C. E. Brack Gynecology Dr. Wm. Gard- ner	Board of Govern- ors	Jan.	Ob. Gyn.	Ob. Gyn.	Internes	1 yr.	July 1	1 None	Yes	No	Genl. rotating
						Asst. Res.	1 yr.	July 1	1 \$ 25	Yes	Yes	
						Residents	1 yr.	July 1	1 \$ 50			Yes

surrounding the radium. When 1 mm. of brass was used with a total radium dosage of from 4,000-4,500 mg. hours, clinically a large, sloughing, necrotic area remained in the cervix and vagina for many months despite the absence of demonstrable cancer. Epithelial regeneration was extremely slow so that a discharge annoyed the patient for long periods of time. The cause for this was discovered soon after these routine sections were studied and compared with similar sections taken after radium of the same or larger doses filtered through 1 to 2 mm. platinum equivalent instead of 1 mm. brass. Clinically with the heavier filtration there was rapid retrogression of the local lesion with complete healing in from four to eight weeks. The crater, when present originally, had disappeared, leaving a more or less normal-appearing cervix. Usually with these heavy filters redness was the only sign of radium having been used. In the tissue radiated through brass, a dense fibrosis with an endarteritis completely occluding the vessels is seen microscopically, so that the blood supply to the surface is insufficient to maintain an epithelial regeneration whereas in the tissue radiated through the gold or platinum a soft fibrosis takes place. In this tissue, although an endarteritis is also present, it is to a much lesser degree so that the vascularity of the tissue is not greatly impaired and the epithelial regeneration can be seen in practically all of the sections. These histologic pictures explain the difference observed clinically.

When a filter of lesser density such as 1 mm. brass is used, a fairly large amount of beta radiation is not absorbed and is accordingly transmitted into the tissues. These beta rays are similar in action to the hot cautery and cause destruction of normal and cancer cells alike, thereby increasing the likelihood of fistula formation. By the use of filters of 1.5 mm. 18 karat gold, practically 100 per cent of the beta rays are absorbed and the tissues receive 100 per cent gamma radiation. The clinical application of this principle is proved by the marked reduction in the number of vesicovaginal and rectovaginal fistulas due directly to radium since the use of heavy filters. Prior to 1933 the production of fistulas by radium was not uncommon. Since this time only one fistula has been produced directly by radium. This patient had a moderately advanced type of tumor which showed some slight microscopic changes from the preliminary course of x-ray. The tumor was Grade II (Broder's classification), which is not supposed to be radiosensitive. She received 5,000 mg. hours of radium filtered with 1.5 mm. 18 karat gold and 1 mm. rubber, but in spite of the heavy filtration, the relatively small radium dose, and the radio-resistant type of tumor, a fistula rapidly opened and has remained so until the present time. The patient has gained more than thirty-five pounds in weight and has been clinically free of cancer for more than two years. We feel that this fistula developed because of overirradiation, although prior to treatment there were no indications that the 5,000 mg. hour dose of radium would not leave a sufficient margin of safety.

In a previous publication dealing with histologic grading in carcinoma of the cervix we concluded that grading alone was of no prognostic value, although in other portions of the body, such as the lower lip, there was a definite relationship between grade of tumor and prognosis. Additional material for a continuation of this study became available with these cases. New cases were classified, according to the clinical extent of the disease, into four groups, and also into four groups according to their microscopic grade. One hundred fourteen cases were studied; there were 3 adenocarcinoma Grade II, 49 squamous cell carcinoma Grade II, 56 squamous cell carcinoma Grade III, and 6 squamous cell carcinoma Grade IV. Because of the absence of any Grade I cancer in this series

Boston Lying-In Hospital, Boston, Mass.	Obstetrics Dr. F. C. Irving*	Supt. of Hospital	May and Nov.	Ob. 3140 Gyn.	Ob. plus Gyn. =150	Internes	6 mo.	Monthly	Ob. 12	None	Yes	2 yr. in genl. hosp.	Obstetrics only
						Asst. Res.	6 mo.	Jan. and July		\$83.33	Yes	Grad. Boston Lying-In	
						Residents	6 mo.	Jan. and July		\$125	Yes	Grad. Boston Lying-In	
University Hospital, Ann Arbor, Mich.	Dr. N. F. Miller*	Dr. Miller		Ob. 425 Gyn. 18	Ob. 40 Gyn. 95	Internes	1 yr.	July 1	2	None	Yes		Rotating service incl. 4 wk. ea. Ob. and Gyn.
						Asst. Res.	1 yr.	July 1	2	\$ 25	Yes	1 yr.	Instructor and Jr. Instructor appointed by Med. Sch.
						Instructors	2 yr.	July 1	2	\$120	No	2 yr.	From affiliated hospitals
City of Detroit Receiving Hospital, Detroit, Mich.	Obstetrics Dr. W. F. Seeley* Gynecology Dr. H. W. Yates	Supt. of Hospital		Ob. 1652 Gyn. 1609	Ob. 65 Gyn. 52	Internes							Preceded by 1 yr. as Jr. Res. in Ob., Herman Kiefer Hosp.
						Junior Resident	1 yr.	July 15	Gyn. 1	\$83.33	Yes	Yes	Preceded by 1 yr. as Sr. Res. in Ob., Herman Kiefer Hosp.
						Residents	1 yr.	July 15	Gyn. 1	\$125	Yes	Yes	

from those treated with more than this amount of radiation. Seventy-three patients were treated with more than 4,500 mg. hours' radiation with 43 or 57 per cent local primary cures. Forty-one were treated with less than 4,500 mg. hours' radium radiation with 24 or 58 per cent local primary cures. The primary results were practically the same. However, these figures do not reveal the whole truth as the cases were followed periodically, and it was found that whereas 14 per cent of the patients treated with more than 4,500 mg. hours' radiation had any recurrence of cancer in the cervix or vagina, 46 per cent of those treated with less than this amount of radium had local recurrences. Although comparatively small doses of radium may cause complete clinical and histologic regression of cancer in the cervix and vagina, there will be a local recurrence in almost half of the patients so treated. On the other hand, when larger doses of radium are used, there may be no greater number of primary local cures, but there will be comparatively few recurrences in the cervix. It must be clearly understood that a primary local cure after radiation does not necessarily mean that the patient is clinically free of cancer for about one-third of the patients who had completely healed cervixes have died of pelvic or distant metastasis without a local recurrence.

It has been stated that there were marked clinical benefits to the patient from the relatively small amounts of preliminary external irradiation with roentgen rays. However, it was not possible to note these changes microscopically to the same degree as they were noted macroscopically. In only about 20 per cent of all patients treated with roentgen rays were there rather marked histologic changes. These changes consisted of the cells becoming degenerated, marked vacuolization, and fibrosis. In an additional 30 per cent of the patients treated there were lesser changes demonstrable, consisting mainly of an increase in the size of the cells with a tendency to become more acidophilic. In the remaining 50 per cent of the patients treated with the same dosage of x-ray, a diminution of the inflammatory process was the only histologic change noted. Had larger amounts of roentgen rays been used we feel quite sure that marked histologic changes would have been seen in all the cases. Such changes have already been described by Healy and Arneson.

The effectiveness of radiation by the gamma rays of radium decreases rapidly as the distance from the source of energy increases. Therefore, knowing the changes that take place in the tissues as a result of roentgen ray therapy, it seems quite logical to assume that it is the best method available for treating the parametrial extensions that exist in most of the patients seen. These tissues can be treated both before and after radium therapy with large amounts of roentgen rays divided into small daily doses given over a long period of time without the danger to the bowel that large amounts of deep therapy given over shorter periods might cause.

Providence Hospital, Detroit, Mich.	Dr. A. K. Northrop	Supt. of Hospital	Jan. 1	Ob. 1895 Gyn. 272	Ob. 77 Gyn. 7	Internes 1 yr. Residents 1 yr.	July 1 Jan. 1	179 \$100	Yes Yes	No 1 yr.	Rotating serv-ice incl. 3 mo. Ob.
Woman's Hospital, Detroit, Mich.	Obstetrics Dr. L. E. Daniels Gynecology Dr. H. M. Nelson*	Supt. of Hospital	Latter part of Feb.	Ob. 1957 Gyn. 2049	Ob. 100 Gyn. 120	Internes 1 yr.	July 1	\$ 25	Yes	1 yr.	Rotating serv-ice incl. 5 mo. Ob.; 7 mo. Gyn., Surg., Med., Ped.
Minneapolis General Hospital, Minneapolis, Minn.	Dr. J. A. Urner	Dean, Grad. Sch., U. of Minn.; Dr. Urner; or Dr. J. C. Litzenberg	4-6 mo. before service begins	Ob. 1691 Gyn. 1111	Ob. 63 Gyn. 45	Internes 1 yr. Fellowships 3 yr.	July 1 and Jan. 1	2 \$ 50 \$ 75	Yes deducted for maint.	1 yr. req.	Rotating ea. month. Fellows apptd. by Grad. Sch. U. of Minn.; leads to degree of Ph.D. in Ob./Gyn.
University of Minnesota Hospital, Minneapolis, Minn.	Dr. J. C. Litzenberg*	Chief of Service or Dean Grad. School	3 to 6 months before service begins	Ob. 476 Gyn. 831	Ob. 23 Gyn. 26	Internes 3-6 mo. Junior Teaching Fellows 2 yr.	Qtrly. Jan. 1 and July 1	Ob. 1 Gyn. 1 None \$ 50	Yes deducted for maint.	1 yr. rotating 1 yr. deducted for maint.	Fellows appointed by Dean, Grad. Sch. U. of Minn.; leads to degree of Ph.D. in Ob./Gyn.

lead. This screenage is used both for surface and intracavitary application. I should like to ask Dr. Auer if we could expect an improvement in clinical results by an even heavier screenage, such as 2.0 mm. of platinum would give.

Rather routine treatment at the University Hospital consists of an application divided between the cervix and vaginal vault. The vault treatment is with the Curie Colpostat or London Bakelite applicator. No larger quantities than 40 to 60 mg. of radium are used.

As an initial dosage 6,000 to 8,000 mg. hours are used. Patients with good prognosis are irradiated in six to eight weeks with 60 to 70 per cent the original dosage if there is any residual tumor mass on gross examination. A small number of patients have been operated upon after x-ray and radium radiation, a total hysterectomy being performed.

Biopsies have not been a routine procedure, but from the findings disclosed in Dr. Auer's paper, we shall adopt this as a routine measure.

DR. JEAN PAUL PRATT, DETROIT, MICH.—I would like to say a word about the use of hysterectomy in conjunction with x-ray and radium. Our five-year cures of all cases including inoperable ones are about 40 per cent, which is a little higher than the general average. If we analyze our cases, however, we find a little higher percentage of operable cancer than reported by Healy, who has an average five-year cure rate of 22 per cent.

One objection to Dr. Auer's method is that the biopsy is taken close to the place where radium is applied. The site in which the cancer persists is distant from this point and cannot be reached for biopsy.

In two patients treated at another clinic with radiation and hysterectomy by us, the cervix showed definite mitotic figures still present. Two of our own patients treated with radium also showed mitotic figures in the specimen removed at hysterectomy. Therefore, we feel that hysterectomy in conjunction with radiotherapy adds to the margin of safety.

Radiotherapy preceding hysterectomy renders the operation much simpler. The risk of the extensive Wertheim operation is too great to justify its routine use and we employ the simple complete hysterectomy.

DR. RALPH A. REIS, CHICAGO, ILL.—Dr. Max Cutler, who is in charge of our Tumor Clinic in the Michael Reese Hospital, has led us to believe that we will get better results if we use smaller doses in the vagina, in the cervical and uterine canals over a long period. Our treatment consists of 8,000 to 9,000 mg. hours given over a period of eight days followed by external irradiation by means of the four gram bomb. I wish I could paint you a glowing picture. We have had the Tumor Clinic four years and I am not certain that our results are much better than when we were using smaller doses of radium followed by 200,000 volt x-ray therapy.

I do not see how a simple hysterectomy, such as Dr. Pratt suggests, will add anything to our results, because if carcinoma is left in the cervix, it is also left in the parametrial tissue and glands.

I am patiently waiting as we all are for another five years to see whether this tremendous amount of radium is worth all the bally-hoo with which we received it and began to use it.

DR. HAROLD O. JONES, CHICAGO, ILL.—The microscopic picture of tissue removed at biopsy six weeks after radiation seems to me difficult to evaluate. One might have evidence of malignancy after six weeks which would not be present after twelve weeks.

We have not been able to approach Dr. Pratt's 40 per cent of five-year cures by any method, and are still around 23 per cent. Originally we gave five, 6,000 and 7,000 mg. hours, but now we are giving under 4,000 combined with deep therapy. Our results are just about the same.

St. Louis City Hospital, St. Louis, Mo.	Obstetrics Dr. T. K. Brown Dr. T. Y. Ayars Gynecology Dr. T. K. Brown Dr. H. H. Helbing	Hospital Commissioner	Apr. 15 (Apply before Jan. 1)	Ob. 3882 Gyn. 1759	Ob. 60 Gyn. 62	Internes : 1 yr.	24g \$ 25 : Yes	Yes	Rotating service incl. 4 wk. ea. Ob. and Gyn.
St. Mary's Group of Hospitals, St. Louis, Mo.	Dr. Wm. H. Vogt*	Rev. Alphonse M. Schwitala, S. J., Dean	May 1			Asst. Res. 1 yr. July 1	2 \$ 75 Yes	Yes	Upon successful completion of 3-yr. Fellowship, candidate receives degree of Master in Gyn. and Ob. fr. St. Louis Univ. School of Medicine Graduate School
						Residents 1 yr. July 1	2 \$100 Yes	Yes	
						Fellowships 1 yr. July 1	\$ 25		
Barnes & St. Louis Maternity Hospitals, St. Louis, Mo.	Dr. Otto H. Schwarz*	Chief of Service				2nd year 1 yr. July 1	\$ 35	Yes	10 mo. Ob., 2 mo. Gyn.
						3rd year 1 yr. July 1	\$ 45	Yes	
						Internes 1 yr. July 1	7 None Yes	1 yr.	
Jersey City Medical Center, Jersey City, N. J.	Obstetrics Dr. S. A. Cosgrove* Gynecology Dr. Chas. Kelly Dr. Jos. Rector	Medical Director		Ob. Gyn. 70	Ob. Gyn. 62	Asst. Res. 1 yr. July 1	2 \$ 25 Yes	Yes	6 mo. ea. Ob. and Gyn.
						Residents 1 yr. July 1	2	Yes	
						Internes 1 yr. July	Ob. 10 None Yes Gyn. 6	Yes	
						Asst. Res. 1 yr. Jan. and July	Ob. 4 None Yes Gyn. 1	2 yr. 6 mo. gyn.	Rotating service incl. 3 mo. Ob., 2 mo. Gyn.
						Residents 1 yr. Jan. and July	Gyn. 2 None Yes	2 yr. 6 mo. gyn.	
								Yes	

Numerous other cases of infants delivered at term from double uteri are reported in the literature. This is not the case with uterus septus. A thorough search of the literature has revealed practically no successful plastic surgery on the septate uterus, resulting in a uterine body that is adequate to perform its normal function, i.e., first, normal menstruation, and second, permit the uterus to act as an incubator for an ovum, and to successfully give forth a live baby at term.

Von Salaz³ states that operative unification of the two halves of a uterus duplex by the abdominal route may be considered and authors report normal births following it. However, there is great danger, he states, of the surgical scar in the uterus tearing during pregnancy or delivery, or of disturbance in the uterine contractions, because the two halves of the uterus may contract independently. Warlow and Smith⁴ report two cases of uterus duplex bicornis. In both cases, because of dysmenorrhea and complications from pregnancy it became necessary to do hysterectomies. Many similar cases handled in like manner are reported in the medical literature. Steel,⁵ in a patient eighteen years of age, found a septum extending from the fundus, dividing the uterus, cervix and vagina, similar to the two cases reported below. He removed the septum in part but reported no pregnancy to term later. Hirst⁶ reports a case of uterus subseptus in which he operated after the patient had had three deliveries at six months and one earlier miscarriage. Hirst proceeded by the vaginal route and states that this is the best operation if practicable, because it causes no impairment of the expansive power of the uterine body.

Histologically the fusion of the müllerian ducts should form a symmetrical uterine body with sufficient tissue so that when conception takes place the normal uterine cavity with a capacity of 4 c.c., can increase more than five hundred times, and yet not thin out or overstretch the uterine wall to the extent that there is danger of rupture before term. If there is insufficient uterine tissue involved in the pregnancy either abortion or a miscarriage takes place, or the uterus ruptures when its capacity has reached its limit. This is exactly what happens in tubal pregnancy. In case of a septate uterus, if a pregnancy takes place in one half, the uterine wall of the other half hypertrophies, and by its bulk it may obstruct the delivery from the impregnated half, making serious mechanical difficulty and danger from hemorrhage; or it may be the cause of an erroneous diagnosis, by giving the impression to the obstetrician of a myoma, an ovarian cyst, or an extrauterine fetal sac. If the septum extends only part way down to the cervix from the fundus (uterus subseptus) the ovum may be able to make use of sufficient amount of the uterine tissue to reach term and be born alive. A viable baby is the exception rather than the rule, even in uterus subseptus (DeLee⁷). In such cases unfavorable presentations occur and the fetus often is deformed.

Since lipiodol x-ray of the uterus with pneumoperitoneum has come into use it is much more simple to diagnose and differentiate most uterine abnormalities. Once the proper diagnosis has been made it is

OBSTETRICS AND GYNECOLOGY

7

King's County Hos- pital, Brook- lyn, N. Y.	Dr. C. E. Rynd	Medical Supt.	May and Nov. for July and Jan. appts.	Ob. 2891 Gyn. 3113	Ob. 120 Gyn. 90	Internes					"No straight internship offered"		
						Asst. Res.	1 yr.	Jan. 1 and July 1	2	None	Yes	2 yr. rotat- ing	
Long Island College Hos- pital, Brook- lyn, N. Y.	Dr. A. C. Beck*	Chief of Service	Jan. 15	Ob. 1411 Gyn. 630	Ob. and Gyn. ab. 100	Residents	1 yr.	Jan. 1 and July 1	2	\$100	Yes	Yes	6 mo. ea. on Ob. and Gyn.
						Internes	1 yr.	Jan. 1 and July 1	4	None	Yes	Yes	
						Asst. Res.	1 yr.	July 1	2	\$ 25	Yes		Rotating serv- ice incl. 6 mo. Ob., 6 mo. Gyn.
Methodist Epis- copal Hospi- tal, Brook- lyn, N. Y.	Dr. O. P. Hump- stone*	Senior Obstetri- cian		Ob. 100 Gyn. 4	Ob. 100 Gyn. 4	Residents	1 yr.	July 1	1	\$ 50	Yes		Yes
						Internes	4 mo.		Ob. 2	None	Yes	Yes	Yes
						Asst. Res.	6 mo.	Jan. 1 and July 1	Ob. 1	None	Yes	2 yr. genl. hosp.	No
Buffalo Gener- al Hospital, Buffalo, N. Y.	Obstetrics Dr. F. C. Golds- borough* Dr. W. T. Get- man Gynecology Dr. F. C. Golds- borough* Dr. J. E. King*	Supt.	Dec. 15	Ob. 769 Gyn. 1012	Ob. 28 Gyn. 4	Residents	1 yr.	July 1	Ob. 1	\$100			No
						Internes	1 yr.	July 1	1 ev- ery 3 mo.	None	Yes	No	No
						Asst. Res.	1 yr.	July 1	Ob. 1	\$ 25	Yes	1 yr.	Rotating serv- ice incl. 1 mo. Ob., 2 mo. Gyn.
Bellevue Hospi- tal, New York, N. Y.	Dr. W. E. Stud- diford	Chief of Service	April 1	Ob. 1642 Gyn. 2242	Ob. 82 Gyn. 80	Residents	1 yr.	July 1	None	\$ 50	Yes	2 yr.	Usually
						Internes	1 yr.	July 1	8	None	Yes	1 yr.	Usually
						Residents	3 yr.	July 1	1	Yes	Yes	1 yr. genl.; 1 yr. Ob. & Gyn.	Yes 1st yr. Path. 2nd yr. Obst. 3rd yr. Gyn.

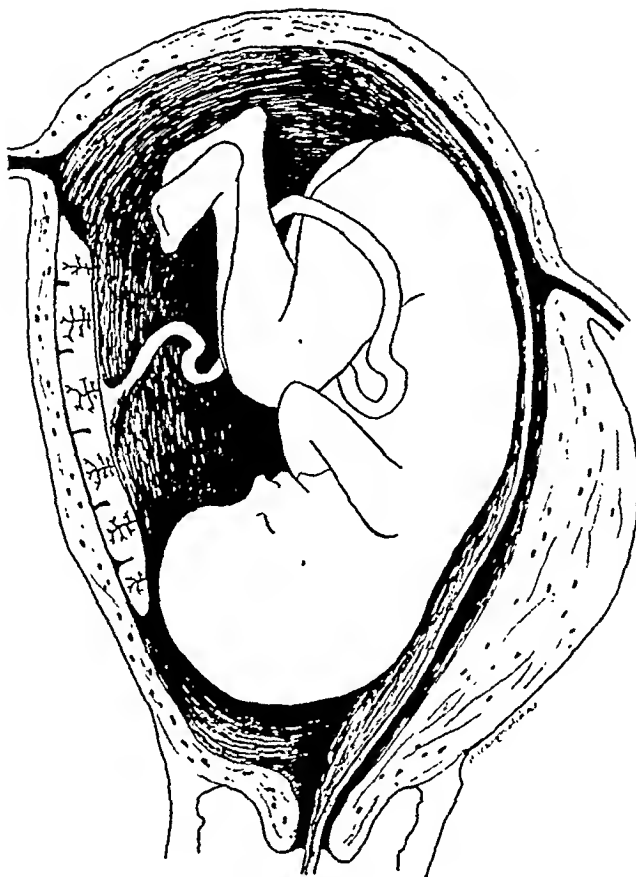


Fig. 2.—Diagrammatic cross-section of a pregnant uterus septus.

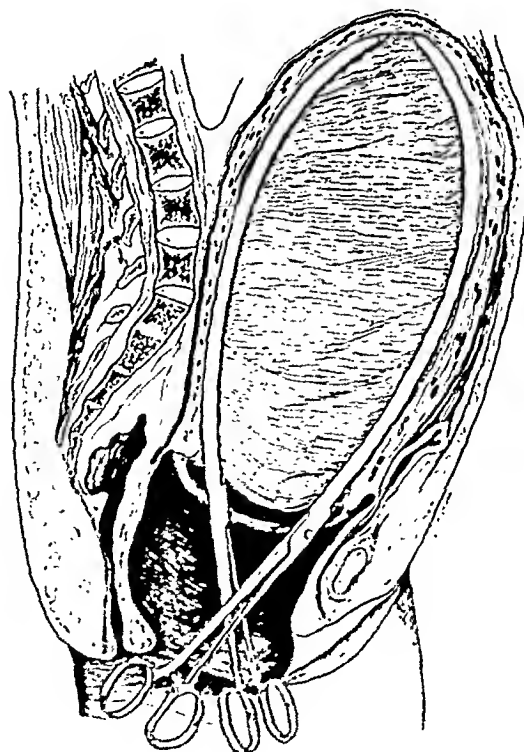


Fig. 3.—Showing application of clamps to the septum before removal.

the time of the miscarriage a vaginal examination revealed a septum in the uterus extending down to the external os. The septum was removed by the same procedure as described above. Recovery was uneventful. The accompanying lipiodol x-ray was taken eight months after the removal of the septum (Fig. 5). Aug. 19, 1934, she gave birth to a full-term baby. She had some spotting during the first five months of pregnancy. The labor and recovery were uneventful. The baby is alive and normal.

A section of neither septum was examined microscopically for muscle tissue. The fact that there is a tendency toward hemorrhage would suggest a lack of muscle tissue, and a preponderance of endometrium in the septum. Furthermore, if the septum was composed of a layer of muscle tissue in proportion to the thickness of the external uterine wall, there should be enough contractile power in it to prevent hemorrhage at time of delivery. On the other hand, if there were muscle fibers in the septum, they would be a continuation of the fibers beginning at the cornu and extending down into the septum. After removal of a septum composed of muscle tissue the contractions of the uterus might be disturbed. The fact that there was no disturbance in the contractions of the uterus in either of the cases reported, would suggest there was little or no muscle tissue in the septum.

It would seem logical to assume that developmental errors in the uterine musculature may be the cause for such dystocias as Bandl's ring, and other disturbances of the normal function of the uterus during labor.

I wish to thank Dr. Sage for permitting me to remove the septum on Case 2, and also for the use of the lipiodol x-ray on this patient.

REFERENCES

- (1) *Bainbridge, W. S.*: AM. J. OBST. & GYN. 8: 3, 1924. (2) *Debierre, Charles*: Prof. Anat. DeLille, Faculte DeMed. (3) *Von Salaz, P.*: Monatsschr. f. Geburtsh. u. Gynäk. 94: 321, 1933. (4) *Warlow and Smith*: Surg. Gynec. Obst., October, 1922. (5) *Steele, H. G.*: W. Va. M. J., January, 1921. (6) *Hirst, B. C.*: Am. J. Obst. 79: 790, 1919. (7) *DeLee, Joseph B.*: Principles and Practice of Obstetrics, ed. 5, 1930, p. 555.

1530 MEDICAL ARTS BUILDING

DISCUSSION

DR. A. G. POHLMAN, OMAHA, NEB.—The development of the female sex ducts is contrary to the general embryologic rule governing such developments on three counts: first, the duct is not structurally associated and continuous with the gland proper; second, the duct does not arise by a surface invagination but is differentiated out from above down and makes secondary contact with the surface upon which it opens; and third, a selective influence through the gonad determines whether or not the continued development of the duct shall take place.

The persistence of the double müllerian fundament and the variations in the degree of the fusion were illustrated by the essayist. It so happens that the mesenchyme condensation about the double duct takes place at an earlier stage than the fusion of the double lumen. Accordingly most of these uterine septa should contain little muscle tissue and the normal functional relation of uterine muscle to endometrium would be wanting.

St. John's Hos- pital, Cleve- land, Ohio	Obstetrics Dr. C. A. O'Connell Surgery incl. Gynec. Dr. G. P. O'Malley	Interne Commit- tee or Sister M. Carmelita	Middle of Dec.	Ob. 615 Gyn. 238	Ob. 28	Internes 1 yr.	July 1	6	\$12.50	Yes	No	Rotating, Gyn. incl. with Surgery
St. Luke's Hospital, Cleveland, Ohio	Obstetrics Dr. A. J. Skeel	Supt. of Hospital	Dec. 1-10	Ob. 1013 Gyn. 264	Ob. 55 Gyn. varies	Resident Internes Asst. Res. Residents Asst. Res. Residents	1 yr. July 1 July 1 July 1 July 1 July 1 July 1	Ob. 1 Ob. 1 1-4g Ob. 1 Ob. 1 Ob. 4 Gyn. 2 Ob. 1 Gyn. 1	\$ 25 \$ 50 None \$ 25 \$ 75	Yes Yes Yes Yes Yes Yes	Yes Yes No Yes Yes Yes	Rotating Usually Yes No internships Usually
University Hos- pitals of Cleveland, Cleveland, Ohio	Obstetrics Dr. A. H. Bill* Gynecology Dr. A. H. Bill* Dr. W. H. Weir*	Director of Hosp.	Jan. 1	Ob. 2003 Gyn. 1188	Ob. 234 Gyn. 20	Internes 1 yr.	July 1	Ob. 1 Gyn. 1				Rotating
Starling-Loving Hospital, Columbus, Ohio	Obstetrics Dr. Andrews Rogers* Gynecology Dr. Fred Fletcher* Dr. P. J. Reel	Interne Com- mittee	Middle of Dec.	Ob. 634 Gyn. 368	Ob. 396 Gyn. 236	Internes 1 yr.	July 1		Yes			Rotating serv- ice incl. 1½ mo. ea. on Ob. and Gyn.
Miami Valley Hospital, Dayton, Ohio	Obstetrics Dr. Gordon Erbaugh	Supt. of Hospital	Dec.	Ob. 881 Gyn. None	Ob. 44 Gyn. None	Internes 1 yr.	July 1	Ob. 1 Gyn. 1	\$ 75	Yes	Plus 2 yr. surg. res.	Rotating serv- ice with 1½ mo. Ob.; no Gyn.
Women's and Children's Hospital, Toledo, Ohio	Dr. W. W. Brand	Director of Hosp.	Jan. 1	Ob. 330 Gyn. 114	Ob. 50 Gyn. 10	Residents 1 yr. Mixed Resi- dency	July 1 July 1	Ob. 1 Gyn. 1	\$ 75 \$ 25	Yes Yes	Yes Yes	Rotating resi- dency incl. Ob., Med., Surg., Pedi- at.

clinic, the Wassermann test was negative, the blood pressure was 132/84, and the urine showed a trace of albumin. There was nothing of note in the personal, family, or past history except that the patient had had mild scarlet fever a short time before the date of conception.

On examination the patient appeared to be in distress. She was warm, the color was good, pulse 100, of good quality, blood pressure 122/82. The area of heart dullness was broad, the apex beat was not felt. The heart was regular, no murmurs; the sounds were distant but clear and of a ringing quality similar to that of the fetal heart sounds. The size of the uterus corresponded to the period of gestation. There was tenderness and muscle rigidity over the right lower two-thirds of the abdomen. The uterine muscle was in constant contraction. The fetal heart was heard in the midline below the navel but position could not be determined by abdominal palpation except to note that the head was at the pelvic inlet. The cervix was soft but not effaced or dilated. There was a sense of boggiess to the right of the cervix and very slight vaginal bleeding. A diagnosis was made of premature separation of the placenta, and after consultation cesarean section was elected as the procedure of choice.

On opening the abdomen the uterine veins were found greatly dilated. The uterine cavity was opened by a classical incision and a living male child weighing 7 pounds 5 ounces (3,323 gm.) was delivered. The placenta was elongated, extending over the lower two-thirds of the right lateral wall of the uterus with the insertion of the cord at the upper margin. The lower half of the placenta was separated from the uterine wall by 200 to 300 c.c. of dark and unclotted blood. The wall of the uterus was not infiltrated, and it contracted firmly with but little blood loss. As the wound was being closed the pulse became fast and thready, then imperceptible. Attempts at resuscitation were unsuccessful.

Necropsy: (Significant findings as reported by Dr. J. Marshall Neely.) There was no evidence of exsanguination. The diaphragm was at the level of the third interspace on the right and the fourth on the left. The liver border extended below the costal margin. The pericardium was parchment-like in character with definite thickening and contained over 600 c.c. of slightly blood-tinged fluid. The transverse diameter of the heart was 9 cm. The organ was not remarkable in appearance except that the right ventricle was totally collapsed with the lateral wall in contact with the interventricular septum.

On microscopic examination there was fibroblastic and polyblastic proliferation beneath the epicardium and of the pericardium, apparently not of recent origin. Although no Aschoff bodies were found, the reaction was thought to represent rheumatic type of histology. Grossly the kidneys were normal but microscopically there was evidence of focal nephritis.

DISCUSSION

While no report of a similar case has been found in the literature, many are recorded in which some parallel phases have been observed and studied. The relative infrequency of the diagnosis of pericardial effusion during life has been noted by Camp and White,¹ who found that in 129 cases with an effusion of 100 c.c. or more only six were correctly diagnosed and in no instance was the diagnosis made in the presence of less than 500 c.c. The widening of the area of heart dullness due to the rotation of the heart is regarded as a normal finding late in pregnancy.^{2, 3}

Except for observations in pericardial effusion and adhesions, the works on physiology offer little information on changes in venous pressure during effort or in the presence of vascular or systemic disease. Pericardial effusion has been commonly observed following scarlet fever. Williamson and Ets⁴ and others⁵ conclude from clinical and experimental observations that as the intrapericardial pressure is increased there is a general rise in the venous pressure and lowering of the arterial pressure.

Kensington Hospital for Women, Philadelphia, Pa.	Dr. E. A. Schumann*	Chief of Service	Jan. 1 & July 1	Ob. Gyn. 1107 484	Ob. Gyn. 65 36	Junior Resi- dents	6 mo. 2 yr.	Jan. 1 and July 1	Ob. 1	None	Yes	Yes	Yes	Rotating serv- ice incl. 12 mo. ea. Ob. and Gyn.
Pennsylvania Hospital, Philadelphia, Pa.	Service "A" Dr. C. B. Lull Service "B" Dr. R. A. Kim- brough, Jr.	Supt. or Chief of Service	Internes: apply by Nov. for Feb. appt.; Resi- dents apply 2-3 mo. before start of service	Ob. Gyn. 2565 649	Ob. Gyn. 125 25	Internes	2 yr.	July 1	9	None	Yes	Yes	Yes	Rotating serv- ice incl. 81 days Ob. and Gyn.
Philadelphia General Hos- pital, Phila- delphia, Pa.	Dr. F. C. Ham- mond*, Dr. J. A. Mc- Glenn Dr. E. A. Schu- mann* Dr. C. B. Lull Dr. C. Macfar- lane* Dr. P. E. Wil- liams* Dr. W. J. Thu- dium	Supt. of Hospital	June 1	Ob. Gyn.	Ob. Gyn.	Internes	2 yr.	July 1	60g	None	Yes	No	Yes	Rotating serv- ice with 2 mo. Ob.
						Asst. Res.	1 yr.	July 1	1	\$100	Yes	Yes	Prefer- ably	
						Residents							No	

2. The amount of albumin in the urine is never very great, varying before delivery between a fraction of a gram and 2 grams per liter, although the lower figures are most usually observed. The albumin disappears during the puerperium and the patient leaves the service either with no albumin at all, or with at the most 0.1 gram per liter.

3. The outstanding characteristic is the fact that in subsequent pregnancies the patient's condition does not become aggravated, and she is as well as, or better than, she was in the preceding pregnancy. Each of our 14 cases clearly demonstrates this point.

4. The blood chemistry as well as the urinary analysis reveals nothing abnormal.

That the number of pregnancies through which the individual may go plays any rôle in the development of this entity is very doubtful for the reason that we observe it in primiparas as well as in all degrees of multiparity. . . . All we can say is that the kidney reserve seems to be too low to meet the extra demands of pregnancy as is manifested by the passage of a certain amount of albumin through the glomerular epithelium and by a moderate elevation of blood pressure, and that these manifestations usually disappear completely within two weeks after delivery. Furthermore, the kidney substance does not seem to have been injured by pregnancy and the kidney reserve is certainly not lower in subsequent pregnancies.

By leaving out of consideration all other groups, and by conforming strictly to this definition we have been able to select 188 cases for special study. No case followed for less than one full year was included. The period of follow-up ranged from one to twenty-four years, the average being seven years. All cases complicated by rheumatic heart disease, thyroid disease or any other disorder which might influence the blood pressure were excluded. Conforming to the definition quoted, none showed elevation of the systolic blood pressure of more than 150 mm. Hg

TABLE I

HIGHEST ANTEPARTUM BLOOD PRESSURE: SYSTOLIC	CASES	FOLLOW-UP BLOOD PRESSURE: SYSTOLIC				
		UNDER 130	130-139	140-149	150-159	160 plus
130-139	11	5		5		1
140-149	89	29	14	17	13	16
150	88	14	19	18	13	24
Total	188	48	33	40	26	41

TABLE II. GROUP OF 63 CASES WITH HYPERTENSION IN THE FOLLOW-UP

SYSTOLIC BLOOD PRESSURE	130-139	140-149	150-159	160-179	180-199	200 plus	Total
Cases	2 (High diastolic)	8 (High diastolic)	10	27	11	5	63
DIASTOLIC BLOOD PRESSURE	to 90	90-99	100-109	110-119	120-129	130 plus	Total
Cases	2 (High systolic)	13	28	10	8	2	63

Institution	Obstetrics Dr. C. R. Han- nah* Gynecology Dr. Elbert Dun- lap	Medical Director (Before Mar. 15)	Apr. 1	Ob. 1033 Gyn. 1110	Ob. 50 Gyn. 75	Internes	2 mo. 1 yr.	1st of ca. mo.	\$ 25	Yes	No	Rotating serv- ice incl. 2 mo. ca. Ob. and Gyn.
Baylor Univer- sity Hospital, Dallas, Tex						Residents	1 yr.	July 1	\$ 75	Yes	Yes	Yes
						Internes	1 yr.		None	Yes	No	Rotating serv- ice with 3 mo. ca. Ob. and Gyn.
						Asst. Res.	1 yr.		\$ 25	Yes	No	
						Resident	1 yr.	July 1	\$ 50	Yes	No	Rotating with 2 mo. Ob. and Gyn.; 6 mo. Surg. and Gyn.
Hospital of Medical Col- lege of Vir- ginia, Rich- mond, Va.	Obstetrics Dr. H. H. Ware Gynecology Dr. I. A. Big- ger	Supt. of Hospital Division	First week in Dec.	Ob. 900 Gyn. 1200	Ob. 31 Gyn. 7	Asst. Res.	1 yr.		\$ 25	Yes	Yes	
						Internes	1 yr.	July 1	None	Yes	No	
						Asst. Res.	1 yr.	July 1	None	Yes	Yes	Usually
						Residents	1 yr.	July 1	\$ 50	Yes	Yes	Usually
University of Virginia Hospital, University, Va.	Ob. and Gynec. Dr. T. J. Wil- liams* Surgery and Gynec. Dr. E. P. Leh- man	Supt. of Hospital	July 1	Ob. 154 Gyn. 1200	Ob. 15 Gyn. 30	Internes	1 yr.	July 1	None	Yes	No	Rotating in- ternship with 1 mo. on Ob. and Gyn.
						Asst. Res.	1 yr.	July 1	\$ 50	Yes	Yes	No
						Residents	1 yr.	July 1	\$ 75	Yes	Yes	Yes
						Internes	1 yr.	June 15	\$ 10	Yes	No	Rotating in- ternship
State of Wis- consin Gen- eral Hospi- tal, Madison, Wis.	Dr. J. W. Har- ris*	Supt. of Hospital		Ob. 1691 Gyn. 1065	Ob. 66 Gyn. 82	Internes (Sr.)	1 yr.	July 1	\$ 50	Yes	Yes	Yes
						Internes (Sr.)	1 yr.	July 1	\$ 100	Yes	Yes	Yes
						Junior Physi- cians	1 yr.	July 15		Yes	Yes	Appointment through Civil Service examination
Milwaukee County Gen- eral Hospital, Wauwatosa, Wis.		Milwaukee County Civil Service				Internes	1 yr.	July 1	\$ 10	Yes	No	Rotating in- ternship
						Asst. Res.	1 yr.	July 1	\$ 50	Yes	Yes	No
						Residents	1 yr.	July 1	\$ 75	Yes	Yes	Yes
						Internes	1 yr.	June 15	\$ 10	Yes	No	Rotating in- ternship

showing hypertension in the follow-up the blood pressure postpartum was normal (Chart 1). This drop of a hypertension to a normal pressure in the puerperium is very striking. Along with the hypertension the follow-up revealed other stigmas of cardiovascular disease, such as ocular changes, especially in the retinal vessels; cardiac enlargement; obvious thickening of the brachial vessels; vasomotor or circulatory symptoms such as headaches, dyspnea, palpitation. The incidence of these is shown in Table III. Albuminuria was generally absent, or present as a trace only.

TABLE III

SIGNS AND SYMPTOMS IN THE FOLLOW-UP	GROUP OF 63 CASES WITH HYPERTENSION		GROUP OF 125 CASES WITH BLOOD PRESSURE BELOW 150 MM. HG SYSTOLIC	
	CASES	%	CASES	%
Retinal vascular changes	33	52.4	29	23.2
Albuminuria	20	31.7	20	16.0
Cardiac symptoms	20	31.7	18	14.4
Edema, however slight	7	11.1	11	8.8

It has been frequently noted that women with toxemia of pregnancy have a certain bodily habitus. They are likely to be short and stout, inclining to plethora. Table IV shows that in the group with hypertension in the follow-up the average weight was higher than in that with normal blood pressure or only a slight rise in the follow-up.

Similarly, studies in height, illustrated in Table V, emphasize that the majority of women in both groups were of small stature, though no

TABLE IV

WEIGHT IN FOLLOW-UP (POUNDS)	GROUP OF 63 CASES WITH HYPERTENSION		GROUP OF 125 CASES WITH BLOOD PRESSURE BELOW 150 MM. HG SYSTOLIC	
	CASES	%	CASES	%
To 100	1	1.6	1	0.8
100-109	5	7.6	14	11.2
110-139	9	14.8	37	29.6
140-159	10	15.8	36	28.8
160-179	10	15.8	17	13.6
180-199	8	12.7	7	5.6
200 plus	12	19.0	3	2.4
Not noted	8	12.7	10	8.0

TABLE V

HEIGHT	GROUP OF 63 CASES WITH HYPERTENSION		GROUP OF 125 CASES WITH BLOOD PRESSURE BELOW 150 MM. HG SYSTOLIC	
	CASES	%	CASES	%
Under 5'	3	4.7	10	8.0
5' to 5' 2"	22	35.0	43	34.4
5' 3" to 5' 5"	28	44.4	48	38.4
5' 6" and over	3	4.7	16	12.8
Not noted	7	11.1	8	6.4

Hospital	Asst. Supt.	April or May	Ob.	Senior Appt.	2 yr.	2	None	Yes	1 yr. req.	Teaching hosp. U. of Toron- to. Total beds
Toronto General Hospital, Toronto, Ont.		April or May	Ob. Gyn. 105	Senior Appt.	1 yr.	July 1	Ob. 1 Gyn. 1	Yes	Req.	Teaching hosp. U. of Toron- to. Total beds 552
St. Michael's Hospital, Toronto, Ont.	Dr. N. D'Arey Frawley	Jan.	Ob. Gyn. 100	Senior Appt.	1 yr.	July 1	Ob. 1 Gyn. 1	Yes	Req.	Teaching hosp. U. of Toron- to
Toronto Western Hospital, Toronto, Ont.	Supt. of Hospital	Jan.	Total beds 312	Senior Appt.	1 yr.	July 1	1	Yes	1 yr. req.	Teaching hosp. U. of Toron- to.
Victoria Hos- pital, London, Ont.	Supt. of Hospital	Dec.	Total beds 400	Senior Appt. (Resi- dent)	1 yr.	July 1	1	Yes	1 yr. req.	Teaching hosp. U. of West- ern Ontario
Winnipeg Gen- eral Hospital, Winnipeg, Man.	Supt. of Hospital	Jan. or early Feb.	Ob. Gyn. 100	Residents		July 1	2	Yes	2 yr. req.	Total beds 663
St. Boniface Hospital, St. Boniface, Man.	Gynec- ology Dr. C. R. Rice		Total beds 471	Senior Appt.		June 1	Ob. 1 Surg. Gyn. 1	Yes	1 yr. req.	Teaching hosp. U. of Man- itoba
Royal Alex- andra Hospi- tal, Edmon- ton, Alta.	Supt. of Hospital	Feb. 1	Total beds 450	Senior Resi- dents		July 1	3	Yes	1 yr. req.	Service incl. 4 mo. Med., 8 mo. Surg. and Gyn.
University of Alberta Hos- pital, Ed- monton, Alta.	Supt. of Hospital	Jan.	Total beds 354	Senior Internes	1 yr.	July 1	3	Yes	Yes	Rotating, 4 mo. Gyn., G. U. and Ob., rest of time Surg. and Ortho- paed. Teach- ing hosp. of U. of Alberta

striking contrasts are presented. The studies of age incidence show nothing remarkable (Table VI). There seems to be no indication that women in the more advanced age groups are more prone to this mild toxemia of pregnancy.

Since a point has been made of the importance of behavior in subsequent pregnancies as a basis of classification, attention may be given to this group (Table VII). Of the 188 cases, 66 were observed through more than one pregnancy at Sloane Hospital. The fetal mortality was nil. But since not all women showing toxemia of any type necessarily

TABLE VII

TOXEMIA IN SUCCEEDING PREGNANCIES AS JUDGED BY B. P.	SYSTOLIC BLOOD PRESSURE IN THE FOLLOW-UP					
	TO 130	130-139	140-149	150-159	160 PLUS	TOTAL
Increased	3		6	1	14	24
Same	4	4	7	6	2	23
Less	6	1	1	1	1	10
Normal	4	1	3			8
In last pregnancy only					1	1

experience another pregnancy, we also grouped those who were primiparas when they came to us and who have not had another pregnancy. There were 58 primiparas in the 188 cases and their blood pressure in the follow-up is shown in Table VIII. As a matter of interest the

TABLE VIII

UNIPARAS	SYSTOLIC BLOOD PRESSURE IN THE FOLLOW-UP					
	TO 130	130-139	140-149	150-159	160 PLUS	TOTAL
Cases	16	13	7	7	15	58
Per cent	27.6	22.4	12.0	12.0	25.8	100.0

uniparas and multiparas are grouped together in Table IX, from which it becomes clear that so far as her ultimate blood pressure is concerned uniparity will not protect the woman against eventual hypertension, as

TABLE IX

GRAVIDITY	FOLLOW-UP BLOOD PRESSURE: SYSTOLIC										TOTAL
	TO 130		130-139		140-149		150-159		160 PLUS		
	CASES	%	CASES	%	CASES	%	CASES	%	CASES	%	
Uniparas	16	27.6	13	22.4	7	12.0	7	12.0	15	25.8	58
Multiparas	17	25.7	6	9.0	17	25.7	8	12.1	18	27.1	66

compared with the fate of her multiparous sister. It may be remarked that the requirement of basing a classification of a toxemia upon the patient's behavior in later pregnancies (which may never occur) is, to say the least, awkward and unsatisfactory. Perhaps more precise knowledge will show that it is not necessary to invoke such an uncertain factor in assigning to the milder toxemias their proper place among the toxemias.

Department of Reviews and Abstracts

CONDUCTED BY HUGO EHRENFEST, M.D.

Selected Abstracts

Physiology and Pathology of Pregnancy

Fairbairn, John S.: Are We Satisfied With the Results of Ante-Natal Care? Brit. M. J. 2: 193, 1934.

The author reviews antenatal work to determine where the weakness lies. The first duty is promoting normal physiologic function throughout the reproductive period, second, the correction of deviations from the normal function, and third, the early discovery of disordered function.

In the eagerness to search for pathology, obstetricians are leaving constructive physiologic hygiene too far in the background. Abortion and induced premature labor for hypothetical trouble has been overdone. There seems to be too little attention paid to the individual patient; she is studied more for her chemical and biochemical reactions than her mental responses. The author stresses the recent literature on the importance of the psychic factor during pregnancy and labor. Early disorders, such as slight losses of blood, vomiting that is not helped by simple remedies, mild albuminurias, and slight rise in blood pressure are not observed any closer than in the so-called normal patient, and these soon become complicated cases.

Lack of coordination and cooperation is noted between the antenatal clinics and the lying-in hospitals where the patient is delivered. The mother is taken care of by one member of the staff for prenatal, another for the intranatal, a third for the postnatal care of the mother, and another for the mother and infant in the infant welfare clinic. In this respect the family practitioner is the ideal supervisor throughout reproduction.

F. L. ADAIR AND I. BROWN.

Browne, F. J.: Are We Satisfied With the Results of Ante-Natal Care? Brit. M. J. 2: 194, 1934.

The author shows that nothing has been done to prevent malformations and stillbirths. In 1927 the stillbirth rate was 38 per 1,000 and in 1932 was 41 per 1,000. The death rate from eclampsia has changed little in the last twelve years. He suggests that eclampsia be a reportable disease to determine its geographic distribution. One explanation would be the decrease in birth rate, since the proportion of first births has increased steadily in the last twenty years over subsequent births, and eclampsia, accidental hemorrhages and difficult labors are more common in primiparas. The success of a prenatal clinic should be based mainly on the reduction of mortality and not on the number of registered patients. Usually examinations are too infrequent and unskilled. Midwives are given calipers for measurements, but yet no manometers which are even more necessary.

TABLE X

CASE	VR. P. U.	R. P. IN P. U.	URINE		A. B.	UREA CLEARANCE				BLOOD UREA-N MG./100
			DAY SP. GR.	NIGHT SP. GR.		I	%	II	%	
1	10	190/130	1.017	1.009	VFT	c _s -28.8	53.4	c _s -34.4	63.6	58.5*
2	10	190/124	----	----	----	c _s -49.0	91.0	c _s -46.6	86.5	88.7
3	10½	160/100	1.009	1.008	VFT	c _s -39.2	72.5	c _s -36.5	67.5	70.0*
4	6	160/100	1.023	1.011	VFT	c _s -76.3	141.0	c _s -75.9	140.0	140.5
5	4½	160/94	----	----	----	c _s -38.0	70.9	c _s -22.4	41.5	56.2*
6	4	200/124	1.023	1.019	0	c _s -40.5	75.0	c _s -44.3	81.5	78.2
7	9	170/115	1.023	1.025	VFT	c _s -46.0	85.0	c _s -42.5	79.0	82.0
8	1½	154/100	1.015	1.023	0	c _s -60.0	111.0	c _s -44.0	81.5	96.2
9	4	160/90	1.028	1.021	VFT	c _s -57.5	106.0	c _s -84.3	131.0	118.0
10	10	180/110	1.023	1.012	VFT	c _s -41.6	77.0	c _s -36.4	67.5	72.2*
11	5	174/84	1.023	1.017	VFT	c _s -66.6	123.0	c _s -73.1	135.0	129.0
12	4	160/90	1.010	1.010	0	c _m -32.7	43.5	c _m -48.1	64.0	53.7*
13	5	200/116	1.024	1.019	VFT	c _s -53.8	99.6	c _m -89.6	161.0	130.3
14	10	170/110	1.021	1.019	0	c _s -70.7	131.0	c _s -87.0	161.0	146.0
15	3	190/118	1.021	1.020	0	c _s -75.6	139.9	c _s -72.6	127.3	123.6
16	4	148/108	1.011	1.014	0	c _s -46.3	85.0	c _s -36.6	67.6	76.3
17	6	160/100	1.030	1.013	0	c _s -34.7	64.2	c _s -42.0	78.0	71.1*
18	10	146/100	1.029	1.029	VFT	c _s -81.8	151.0	c _s -60.6	112.0	131.5
19	7	160/90	1.014	1.026	0	c _s -48.1	89.4	c _s -41.4	76.8	83.1
20	6	140/104	1.018	1.013	VFT	c _s -35.6	66.0	c _s -33.5	62.0	64.0*
21	3	180/102	1.010	1.018	0	c _s -52.6	97.6	c _s -48.5	90.0	93.8
22	8	160/104	1.021	1.027	0	c _s -50.0	92.5	c _s -50.0	93.5	93.0
23	12	180/100	1.022	1.019	VFT	c _s -55.1	103.0	c _s -68.3	126.0	114.5
24	19	176/104	1.018	1.011	VFT	c _m -70.4	94.0	c _s -41.9	77.5	85.7
25	6	176/104	1.010	1.010	0	c _s -44.1	82.0	c _s -38.3	71.0	76.5
26	10	150/100	----	----	----	c _s -78.0	144.0	c _s -63.6	118.0	102
27	3	170/90	1.028	1.032	0	c _s -22.9	42.3	c _s -41.9	77.6	59.9*
28	6	170/90	1.029	1.024	0	c _s -60.5	112.0	c _s -52.6	97.5	104.7
29	9	162/110	1.024	1.018	0	c _s -76.2	141.0	c _s -69.6	129.0	104.6
30	5	172/108	1.021	1.013	0	c _s -57.5	106.0	c _s -56.0	103.5	104.7
31	7	160/100	1.021	1.019	0	c _s -81.5	151.0	c _s -86.0	150.0	121
32	4	160/110	1.018	1.017	0	c _s -69.0	127.5	c _s -66.0	122.0	9.8
33	4	168/94	----	----	----	c _s -47.2	87.5	c _s -45.9	85.0	14.0
34	5	200/120	1.021	1.018	VFT	c _s -44.6	83.0	c _s -41.8	77.2	10.2
35	5	162/96	1.012	1.009	0	c _s -46.8	86.8	c _s -46.3	85.5	15.1
										13.4

*Indicates lowered clearance.

Dowell, D. M.: Preliminary Observations on the Menstrual Cycle and Pregnancy With a Simple Pregnancy Diagnostic Test, *J. Missouri State M. A.* 30: 275, 1933.

The author injected a few minims of an extract of the anterior pituitary gland intradermally into the flexor surface of the forearms of pregnant and nonpregnant women. In the former group there was only a small intradermal wheal signifying a negative reaction and pregnancy. In the nonpregnant group the result obtained was a very marked degree of erythema about the wheal at the injected site, signifying absence of pregnancy. Whether this supposed test is due to an allergic reaction or not is merely a conjecture. This test has been accurate in the author's hands; it is simple, safe, and quite inexpensive.

J. THORNWELL WITHERSPOON.

Valle, Guiseppi: The Diagnostic and Determinative Value of a New Reaction of Pregnancy, *Ostet. e ginec.* 12: 413, 1934.

The histidine test for pregnancy of Kapeller and Adler is positive in 98 per cent of pregnant women, beginning about the second month and becoming negative in the first week of the puerperium. The reaction is positive also in extra-uterine pregnancy. The test becomes negative with the death of the fetus. The distinct advantage of this test is that it is simple and can be done in thirty minutes.

AUGUST F. DARO.

Rayner, E. B.: Heartburn in Pregnancy, *Brit. M. J.* 2: 970, 1933.

The author ascribes heartburn to hypoauidity and believes that it is not always a symptom of hyperauidity. In a series of 45 cases at the Royal Simpson Maternity Hospital, the patients were divided into 3 groups. (I) Those not relieved by alkalis but by acid, 34 cases. (II) Those that were relieved by alkalis in relatively small quantities, 5 cases. (III) Those whose condition was aggravated by acid and not relieved by alkalis, 6 cases. A possible explanation for heartburn is that the stomach has a large margin of safety during digestion and reacts only when that margin is overstepped, as in hyperauidity. Conversely there is a relatively small margin for substances not present during digestion, as mucus, fatty acids, etc. In many hyperauidic and some hypoauidic stomachs the earliest reaction in each is heartburn. There is a fear or anxiety of heartburn; and anxiety lessens secretion and aggravates the hyposecretion, thus making a vicious circle. Dilute hydrochloric acid breaks up this circle. Heartburn is more frequent than the major toxemias of pregnancy and is very important from the patient's standpoint, even though it does not endanger her life. Hydrochloric acid should always be given a trial.

F. L. ADAIR AND I. BROWN.

Abramson, Roberts, and Wilson: Relaxation of the Pelvic Joints in Pregnancy, *Surg. Gynec. Obst.* 58: 595, 1934.

Relaxation of the pelvic joints and particularly of the symphysis pubis is a normal accompaniment of pregnancy. Relaxation of the symphysis begins in the first half of pregnancy, progresses but slightly in the last three months, and is little affected by parturition. Retrogression begins immediately following delivery, and is usually complete by the end of three to five months.

The process of relaxation is physiologic and is probably the result of a hormonal activity.

true chronic nephritis in pregnancy are well known. They present the features of hypertensive cardiovascular disease and of nephritis, respectively.

Naturally, the end-results of the milder types of toxemia are less well known because the sequels are less severe and life expectancy greater. Among 188 cases of this type studied by us one case has come to necropsy.

History.—The patient was a Negress, para viii, aged forty-two years at death. The first pregnancy, in 1918, was characterized by moderate albuminuria and systolic blood pressure rising to 140 mm. Hg in the antepartum period. Later in the same year there was a miscarriage followed by curettage. In 1919 a living child was delivered by forceps, at home. A miscarriage took place in 1922, and in 1924 she went through a normal pregnancy with blood pressure of 126 mm. Hg systolic and 90 mm. Hg diastolic, with a trace of albumin in the urine. Later in the same year there was a spontaneous miscarriage followed by curettage. In 1926 examination in the follow-up revealed a blood pressure of 156 mm. Hg systolic and 110 mm. Hg diastolic, a faint trace of albumin in the urine and definite retinal arteriosclerosis. In 1928 the patient was again delivered at the Sloane Hospital for Women, having had a normal blood pressure throughout pregnancy and no albumin until just before delivery. In 1929 the blood pressure was 214 mm. Hg systolic and 118 mm. Hg diastolic. Being again pregnant in 1930 with persistent hypertension and a faint trace of albumin in the urine, supravaginal hysterotomy was performed. Two months later the blood pressure was 130 mm. Hg systolic and 80 diastolic. Shortly thereafter the blood pressure was elevated to 240 mm. Hg systolic and 126 mm. Hg diastolic with marked cardiac hypertrophy, sclerosis of the retinal vessels, and an accentuated aortic second sound. Two weakly positive and several negative Wassermann reactions are recorded and antisyphilitic treatment was begun in 1931. One year later (in 1932) the blood pressure was 230 mm. Hg systolic and 150 mm. Hg diastolic. Two years later (in 1933) headaches became severe and blood pressure increased to 265 mm. Hg systolic and 145 mm. Hg diastolic. Vomiting, dyspnea, orthopnea, and disturbed mentality occurred. There were marked vascular changes in the retina, edema, increased retention of nitrogen, evidence of myocardial damage, and a terminal pericarditis. Death took place in February, 1933.

At necropsy the anatomical diagnosis was generalized arteriosclerosis, arteriolo-nephrosclerosis, cardiac hypertrophy and dilatation, slight arteriosclerosis of the aorta, fibrosis of the myocardium, acute fibrinous pericarditis, chronic passive congestion of the liver, lungs, and spleen, and fibrous peritoneal adhesions.

The arteriolar lesions were pronounced in the arterioles of the spleen, the portal areas of the liver, the pancreas, the kidneys, and suprarenals. These arteriolar lesions were of the acute necrotizing type and accompanied by moderate secondary atrophy in the involved organs. Certain tubular changes in the kidney, particularly the occurrence of an atypical flattened epithelium containing large amounts of refractile brownish pigment which took a pronounced iron stain, suggested the effect of intensive antisyphilitic treatment. The hypophysis showed a definite proportional increase in the basophilic element similar to changes described in cases of hypertension by Krause.

In its clinical features this case was a typical example of the mild toxemia of pregnancy under discussion. Excepting the possible complication of syphilis, the necropsy findings were characteristic of generalized arteriosclerosis associated with prolonged hypertension.

Guercio, F.: Magnesium in Normal and Pathological Pregnancy. Part I. Magnesiemia and Cationemia in Pregnancy, During Labor and the Puerperium, *Folia gynaeec-demograph.* 31: 607, 1934.

Employing the method of Kalinikowa, the author has studied the magnesium content of blood serum of over 100 patients in all stages of pregnancy. He also studied calcium and potassium by the method of Kramer and Tysdall, sodium by the same method and the micromethod of Muller modified by Condorelli; the method of Bang modified by Cannavo was used for chlorides.

He found that magnesium during pregnancy is present within normal and physiologic limits.

The maximum is 3.61 mg. per cent and the minimum 2.31 mg. per cent.

The values diminish progressively approaching term and even more so during labor. It is not improbable that magnesium is utilized from the mineral reserves of the pregnant woman together with a progressive impairment of the organism of the patient; or the diminution in maternal magnesium may be due to fetal assimilation. Lorenzetti has found a progressive increase in fetal magnesium as pregnancy continues.

Also the cations sodium, potassium and calcium are not notably changed from the normal. There is a slight decrease in sodium as pregnancy goes on. Normal values of potassium are found with a slight increase toward the end of pregnancy, while calcium shows values always below the normal of 10.8 mg. per cent.

Magnesium values show no great increase in pathologic conditions of pregnancy except in cases of eclampsia, where the patients were gravely ill.

MARIO A. CASTALLO.

Guercio, F.: Phosphatemia in Normal and Pathological Pregnancy, in Labor and in the Puerperium, *Folia gynaeec-demograph.* 31: 323, 1934.

The author has found that in the blood serum of normal pregnant women in various periods of gestation, in labor and in the puerperium, and in pathologic pregnancy (eclampsia, albuminuria, abortion, and pernicious vomiting), phosphorus values are within normal limits, even if somewhat elevated, with a slightly greater elevation during labor. During the puerperium the values return to normal. The author observed particular elevation only in two cases of eclampsia, gravely ill, due to the acidosis and the insufficient renal filter for phosphorus.

MARIO A. CASTALLO.

Róna, Andor: Decidual Reaction on the External Cervical Os, *Zentralbl. f. Gynäk.* 56: 3108, 1932.

During the course of interruption of pregnancy in a thirty-six-year-old woman, a polypoid nodule the size of a lentil was noticed on the margin of the external cervical os. Histologically, this nodule proved to be typical decidual tissue. Decidual tissue has been found on the peritoneum, especially that of the intestines, on the ovary, in the fallopian tube, and on the cervical mucous membrane. Rarely, it is found in the vagina and in the lymph vessels of the pelvis. It is not uncommon to find decidual tissue in the upper third of the cervical canal, but very uncommon to find it on the external cervical os. There are many theories as to the etiology of the condition, chief among them being: developmental anomalies, influence of corpus luteum, and mechanical influences such as operative trauma and infectious processes. The clinical interest lies in the fact that decidual tissue on the cervix is one explanation of bleeding during pregnancy, especially the early part.

WILLIAM F. MENGERT.

2. Previous studies have defined the status of nephritis in pregnancy, and of eclampsia and preeclampsia in their relation to chronic inflammation of the kidney and to cardiovascular disease with hypertension respectively.

3. The milder types of late toxemia, vaguely called low reserve kidney, recurrent toxemia or nephritis, in their follow-up and necropsy manifestations, seem to resemble eclampsia and preeclampsia in that their frequent results are general vascular disease with hypertension rather than nephritis. The differences between the severe and milder types of nonnephritic late toxemias are of degree, not of kind.

4. The rôle of the kidney in this disturbance is probably incidental and not fundamental. This organ participates because it is such an important part of the circulation. Placing responsibility upon the kidney primarily seems misleading and to indicate a limited and faulty conception of a process having broader implications.

5. Vague terminology such as low reserve kidney, recurrent toxemia, and so on, confuses thought and should be abolished. The part of general vascular disease in late toxemia of pregnancy needs emphasis.

REFERENCES

- (1) *Corwin and Herrick*: AM. J. OBST. & GYN. 14: 783, 1927. (2) *Herrick and Tillman*: Proc. Assn. Am. Physicians, 1934; Arch. Int. Med. 55: 643, 1935. (3) *McKelvey and MacMahon*: Surg. Gynec. Obst. 60: 1, 1935. (4) *Bell*: Am. J. Path. 8: 1, 1932. (5) *Löhllein*: Deutsche med. Wchnschr. 44: 1187, 1918. (6) *Baird and Dunn*: J. Path. & Bact. 37: 291, 1933. (7) *Goldblatt et al.*: J. Exper. Med. 59: 347, 1934. (8) *Page*: Am. J. Physiol. 112: 166, 1935. (9) *Heynemann*: Zentralbl. f. Gynäk. 58: 3010, 1934. (10) *Schultz*: München. med. Wchnschr. 80: 1972, 1933. (11) *Stander*: The Toxemias of Pregnancy, Baltimore, 1929, Williams & Wilkins. (12) *McCann*: Bright's Disease, Arch. Int. Med. 55: 512, 1935.

16 EAST NINETIETH STREET

180 FORT WASHINGTON AVENUE

Phillips, Miles H.: Men-Midwives of the Past, Bristol Med.-Chir. J. 52: 83, 1935.

The history of the gradual development of specialized care for the parturient, and the rise of the physician into the ranks of "man-midwife" is traced from the time of Hippocrates (400 B.C.) to the early nineteenth century.

The midwife arose in remote times from the custom of a woman attending at the delivery of her neighbor. It became a means of livelihood with some and they devoted their entire time to the trade. The care of the parturient thus fell into the hands of woman and it was deemed her work. Too often a poor type of woman was in the field, and progress in obstetrics was greatly retarded.

Men were barred from the birth room by ignorance and modesty on the part of patient and husband. Thus, in 1522 a Dr. Werdt of Hamburg was forced to put on the dress of a woman in order to attend and study a case of labor. When detected, he was punished by being burnt to death. As late as 1658, Dr. Percival Willoughby, when called into consultation on a possible breech presentation by his own daughter attending the case, crept into the chamber upon hands and knees unseen by the patient, only to examine her in haste under cover.

Many interesting instances of similar nature are recorded. The entry of men into this field and the accumulation of a midwifery literature is described.

F. L. ADAIR AND S. A. PEARL.

reveal many motor disturbances when abnormal types of ejaculation and abnormal curves of elimination of color are present.

AUGUST F. DARO.

Kersley, G. D., and Mitchell, D. A.: A Note on the Anemias of Pregnancy, *Brit. M. J.* 2: 720, 1934.

The authors stress the importance of recognizing the presence of anemia in pregnancy before it reaches a dangerous degree unnoticed because of its insidious onset and course. This is most likely to occur in the last trimester of gestation.

The anemias may be subdivided into five kinds: the common microcytic type, the more rare megalocytic or pernicious type, anemia due to hemorrhage, anemia due to hemolysis following sepsis, and last, the rare idiopathic hemolytic anemia of pregnancy.

The microcytic anemias, which arise from a break in the chain of red cell development or erythron at the level of the normoblast, are due to the lack of iron usually associated with deficient absorption due to hypochlorhydria. The treatment consists of administration of iron in large doses.

The megalocytic anemias, in which a break in the erythron occurs at the level of the megaloblast, need not be accompanied by an achlorhydria and are spontaneously relieved by parturition. Treatment in pregnancy consists of administrations of liver with or without iron.

In the other types of anemia, where little is known of the cause, treatment consists of blood transfusion and, if the patient's condition warrants it, immediate induction of labor or cesarean section.

F. L. ADAIR AND I. C. UDESKY.

Schultz, Willi: The Pseudo-Anemia of Pregnancy, *Arch. f. Gynäk.* 157: 110, 1934.

Carefully carried out examinations of the blood of nonpregnant women show that the lower level of normal range is 70 per cent for hemoglobin and 3,500,000 red blood cells. In 30 to 40 per cent of healthy women, these values are decreased slightly. This is due to an increase in blood plasma. These decreases are harmless and without significance. The author divides all anemic pregnant women into three groups: First, the true pseudoanemias of pregnancy; 30 to 40 per cent of all healthy women are found in this group. The hemoglobin is between 60 and 69 per cent and the red blood cells between three and three and one-half million. The color index and blood picture are normal. This condition is harmless and requires no therapy or consideration. In the second group are the essential anemias of pregnancy. This condition is a true blood dyscrasia and is uncommon. The hemoglobin is under 60 per cent and the red blood cells under three million. This condition is easily controlled by iron therapy. The pernicious type of anemia of pregnancy, which is rare, constitutes the third group. The color index is always less than one. In all other respects this condition resembles true pernicious anemia and responds to liver therapy. In the most rare types of aplastic anemias, only blood transfusions offer relief. The author does not believe that patients pass from one group into the other.

RALPH A. REIS.

Siegel, M., and Singer, B.: Occurrence of Tubercle Bacilli in the Blood of the Umbilical Cord and in the Newborn Infants of Tuberculous Mothers, *Am. J. Dis. Child.* 50: 636, 1935.

Cases of undoubted congenital tuberculosis in stillborn or newborn live babies have been reported in literature. There is evidence that the tubercle bacilli

discusses minutely the definition of this condition and does not think that a second coitus is necessary for superfetation to occur, quoting a case reported by Duerrsen and Zweifel in support of the prolonged existence of sperm in the female genital tract. They found living sperm in an oviduct removed from a woman in which instance it was positively stated that there had been no coitus for four weeks. Recent work by Hammond and Ansell⁷ suggests that sperm do not retain fertility after having been in female generative tract over thirty hours. Ingram-Johnson⁸ in 1921 reported the abortion of a five months' living fetus together with a six weeks' ovum as an example of superfetation. Again his examination was rather superficial. Cathala and Barbaro⁹ in 1925 reported a case of a woman who aborted a well-formed and unmacerated four months' fetus and sac together with a 2 months' ovum. At first they felt that this represented a superfetation but on further study, the placenta of the smaller fetus showed marked fibrosis and necrosis of the villi. Therefore, in spite of the well-preserved appearance of this fetus, they considered the true explanation to be the death of a twin followed later by the abortion of both fetuses. Moench¹⁰ in 1927 reported a patient with a double uterus who prematurely delivered a seven months' fetus who survived, and, three days later, passed a fresh three months' ovum. He considers this an example of superfetation although he never saw the smaller fetus, depending on the word of the midwife who conducted the case. Willis¹¹ in 1929 describes one more case of the abortion of a four months' fetus and sac together with a nine weeks' ovum. Because of the fresh gross appearance he concludes that superfetation must be the explanation. However, no thorough study was carried out. In almost all of these patients bleeding took place at intervals during the pregnancy. This was interpreted by the earlier observers as menstruation. In all the cases in which thorough study was carried out, the smaller fetus was found to have been dead for some time before the abortion occurred. The most suggestive case is that reported by Longmore,⁴ for in this instance the larger fetus was macerated and the smaller appeared fresh. Moreover, this case was accepted by a committee of skeptics. However, no microscopic examination was made of the smaller fetus or placenta. One may conclude that, although this type of case superficially suggests superfetation, the more probable explanation is the abortion of twin pregnancy, one twin having died some time before this event.

A number of instances falling in the second group are found in the older literature in which women gave birth to term infants and subsequently, in each case, from one to four months later, these mothers underwent a second labor and delivered a second child apparently at term. Churchill¹² in 1846 cites a case reported by Bigaud of Strassburg of a woman who delivered a term infant on April 30. On September 17 of the same year she gave birth to a second term infant. This patient came to autopsy when it was found that she had a single uterus. He also cites the case reported by Boivin of a woman who gave birth to a 4-pound child on March 15, 1810. On May 12, 1810, she gave birth to a second infant weighing 3 pounds. Examination revealed a probable double uterus. Alexander Milne¹³ in 1871 cites a case reported by Maton of Palermo of a woman who delivered a term infant on Nov. 12, 1807. On Feb. 2, 1808, or eighty-two days later she delivered a second term infant. Leishman also refers to this case, but considers that the first birth represented the premature delivery of a twin, the second twin being carried to term. Leishman¹⁴ in 1873 refers to a case reported by Möbus at Dieburg of a woman who delivered a healthy term infant on Oct. 16, 1822. Thirty-three days later she delivered a second term girl. Playfair¹⁵ in 1876 refers to an interesting series of cases collected by Bonnar from the records of long-established families. In these cases succeeding children were born at intervals as short as four months. These children all survived. Robert and Fancourt Barnes¹⁶ in 1884 cite a case reported by Naegelé of a woman delivered in Düsseldorf on June 22, 1857, of a large term

Rhemann, F.: The Question of Myomectomy During Gestation, *Monatsschr. f. Geburtsh. u. Gynä.* 99: 298, 1935.

In the opinion of Rhemann conservatism is indicated when fibroids are found during pregnancy, especially when no disturbing symptoms are produced. However, when symptoms arise because of the presence of fibroids, the fibroids should be enucleated during pregnancy, especially in young women. This operation is indicated even should an abortion follow the operation, because the patient can again become pregnant. Fibroids which are cervical or subperitoneal should especially be removed, because these tumors endanger the pregnancy and frequently necessitate the subsequent removal of the uterus. If, during the puerperium, fibroids undergo necrosis and infection, an operation should be performed. Women who had myomectomies during pregnancy should be delivered in a hospital.

J. P. GREENHILL.

Fujita, Y.: Beriberi Complicating Pregnancy and Puerperium, *Jap. J. Obst. & Gynec.* 17: 461, 1934.

Generally speaking, women rarely suffer from beriberi in comparison with men. Yet the occurrence of this disease during pregnancy and the puerperium is not uncommon. Fujita reports 39 cases of this disease, which is due to deficiency of vitamin B. The symptoms include disturbances in the circulatory system, derangements in the nervous system, edema, abnormalities in the gastrointestinal system, and disturbances in various reflexes of the body. In most of the author's cases the disease manifested itself during the summer and early autumn. In the majority of cases the patients were affected during the latter part of pregnancy or during the puerperium. Premature labor often sets in. The mortality is generally given as between 9 and 13 per cent. However, only one of the author's 37 cases who were treated, died. Among the 27 women who had the disease during pregnancy, 7 of the babies died.

The disease may be prevented by people who live on rice by hulling the rice to leave the embryo bud, or they may take an additional supply of vitamin B. In order to overcome the disagreeable symptoms of beriberi it is essential to administer large amounts of vitamin B.

J. P. GREENHILL.

Sze, T. S.: Pregnancy Polyneuritis, *Chinese M. J.* 48: 651, 1934.

Pregnancy polyneuritis is probably a diet deficiency disorder and not a toxemic manifestation. Rational therapy should be directed to supplying the deficiency in the form of a vitamin-rich diet, especially in B content. Prophylaxis consists in supplying abundantly the vitamin, particularly the B complex, in the form of a high protein diet and in avoiding restraint of eating vegetables after puerperium as is common practice among Chinese patients.

C. O. MALAND.

Ueno, J.: Experimental Study of the Effects of Vitamine B on the Female Genital Organs, *Jap. J. Obst. & Gynec.* 17: 388, 1934.

In animals in which a deficiency disease is produced by lack of vitamin B, procreative ability is decreased and some of the animals become sterile. If a pregnancy does occur, abnormalities frequently follow. These may be in the form of uterine hemorrhage during pregnancy, intrauterine absorption of the

after the first coitus. Fifteen days later they produced a second normal litter. He feels that both cases represent instances of superfetation. This evidence presented by Slonaker is the strongest that could be found in favor of the occurrence of superfetation.

Interest in the possibility of this phenomenon was aroused by the two cases occurring in the early part of 1935. The first falls into the first variety that has been reviewed.

CASE 1.—M.S., aged thirty, married, para ii, grav. i, was seen in the Out-Patient Department at Bellevue Hospital on Jan. 4, 1935. She stated that her menses had begun at eighteen, had a twenty-three to twenty-four-day interval, and lasted three to four days without pain. She had had one previous pregnancy having been delivered at New York Hospital on Oct. 28, 1933, of twins about five weeks before the expected date of confinement. They weighed 1,580 and 2,100 gm. This pregnancy was normal except for a slight elevation of blood pressure and mild albuminuria during the latter months. Otherwise her previous history was negative. On admission to the clinic she stated that her last normal menses had occurred about October 6. Slight bleeding had occurred on the preceding day. This had occurred previously on November 7, being quite profuse for one day, and slight spotting occurring for two days following. Intercourse had occurred once in October and three times in December. On examination the uterus was found to exhibit the signs of early pregnancy which was estimated at about three months. She was advised to go home and rest in bed.

She was seen again on January 9 complaining of continued bleeding. One week later she returned with the same complaint and on the following day, January 17, was admitted to the Gynecological Service.

General physical examination was negative. Pelvic examination showed a uterus enlarged, soft and rounded, about the size of a four months' gestation. The adnexa were negative. The cervix was long, softened, closed, and blue. The diagnosis on admission was threatened abortion with the possibility of hydatid mole. She was kept under observation but continued to bleed even with complete bed rest. In hopes of emptying the uterus two series of pituitrin injections were given without success. On January 28, eleven days after admission, she was sent to the operating room and the lower cervical canal and vagina were packed with gauze. Another pituitrin series was given. Although this produced no immediate effect, about eighteen hours after the removal of the packing the patient aborted a small ovum which appeared to be about two months of age. The uterus still remained large and easily palpable abdominally but little bleeding occurred. Ten and a half hours after the first abortion she passed a perfectly formed four months' fetus complete in its sac. Five days later the patient was given a thorough examination under gas. The uterus was explored but no evidence of any congenital anomaly could be found. A few days following this she was discharged from the hospital in good condition.

The following are the pathologic reports on the two specimens:

Specimen A (Fig. 1, left) consisted of a mass of blood clot and a partially collapsed ovum measuring 8 by 5 by 3 cm. On opening the amniotic sac a small fetus was found measuring 3.5 cm. from crown to buttocks. Moderate degenerative changes were present, the head was somewhat flattened. The mouth and nose were formed. The eyes were present with very definite lower lid; upper lid not formed. The head was rather markedly flexed on the body. The upper limbs were well formed; right forearm was flexed on the arm and left forearm was extended on the arm. The chest and abdomen were well formed. Right lower extremity was well extended on the body; left leg was flexed on the thigh. The general appearance

Books Received

ERKRANKUNGEN DER EIERSTOECKE UND NEBENEIERSTOECKE UND DIE GESCHWUELSTE DER EILEITER. Bearbeitet von F. Kermanner, Wien, und L. Nuernberger, Halle. Siebenter Band in Stoeckel's Handbuch der Gynaekologie. Mit 472 zum Teil farbigen Abbildungen im Text, 1014 Seiten. Verlag von J. F. Bergmann in Muenchen.

ANTENATAL AND POSTNATAL CARE. By Francis J. Browne, M.D., Professor of Obstetrics and Gynecology, University of London, etc. With 58 illustrations and 480 pages. J. & A. Churchill, Ltd., London, 1935.

JOHN WHITRIDGE WILLIAMS. By J. Morris Slemmons. The Johns Hopkins Press, Baltimore, 1935.

GROWING SUPERIOR CHILDREN. By I. Newton Kugelmass, Attending Pediatrician of the Broad Street Hospital, New York, etc. Illustrated, 568 pages. D. Appleton-Century Co., New York, 1935.

REGIONAL ANATOMY, adapted to dissection. By J. C. Hayner, Associate Professor of Anatomy, Metropolitan Hospital, New York, etc. 687 pages. William Wood & Company, Baltimore, 1935.

DER GEBURTSTOD (Mutter und Kind). Von Dr. Sigismund Peller. Verlag von Franz Deuticke, Leipzig und Wien, 1936. 110 Seiten.

A B C OF THE ENDOCRINES. By Jennie Gregory, M.S. Foreword by Carl G. Hartman. Illustrated. With 126 pages. The Williams & Wilkins Company, Baltimore, 1935.

FASCIAE OF THE HUMAN BODY and their relations to the organs they envelop. By Edward Singer, M.D., Department of Anatomy, College of Physicians and Surgeons, Columbia University. With 24 original illustrations, and 105 pages. The Williams & Wilkins Company, Baltimore, 1935.

THE PATIENT AND THE WEATHER. By William F. Peterson, M.D. Vol. 1. Part 1. The Footprints of Asclepius. 127 pages. Edwards Brothers, Inc., Ann Arbor, Michigan, 1935.

LEHRBUCH DER GYNAEKOLOGIE. Von Professor Dr. W. Stoeckel, Universitaets-Frauenklinik zu Berlin. Fuenfte, neubearbeitete Auflage, mit 465 Abbildungen im Text und auf 66 farbigen Tafeln. 760 Seiten. Verlag von S. Hirzel in Leipzig, 1935.

PRACTICAL HANDBOOK OF MIDWIFERY AND GYNAECOLOGY. By W. F. T. Haultin, gynaecologist, Royal Infirmary, Edinburgh, etc., and Clifford Kennedy, assistant gynaecologist, Royal Infirmary, Edinburgh, etc. Second edition, with 356 pages. William Wood & Company, Baltimore, 1935.

FOR AND AGAINST DOCTORS. An Anthology, compiled by Robert Hutchison and G. M. Wauchope. 168 pages. William Wood & Company, Baltimore, 1935.

MOEURS ET PROSTITUTION. Par Marcel Rogeat. Les Grandes Enquêtes Sociales. Nouvelles Éditions Latines. 7 Rue Servandoni, Paris, 1935.

places appeared to be more numerous than usual. Adjacent to the decidua were numerous chorionic villi showing a well-developed double layer of epithelium in many instances although in certain villi the epithelium appeared to be undergoing degenerating change. Stroma of the villi seemed to be more fibrosed than usual in healthy living placental tissue. Blood vessels were not numerous but could be found in fair proportion of the villi; when present they seemed small but contained nucleated red blood cells. Numerous syncytial giant cells were present in the intervillous spaces. Between the decidual tissue and the placental sinuses was a well-developed layer of fibrin and necrosis. Sections through fetus showed complete autolysis.

Diagnosis: Early fibrosis of young placental tissue. Autolysis of fetus (eight to ten weeks).

Specimen B (Fig. 1, right) consisted of complete ovum 16 cm. in diameter. The placenta was concentrated at one pole but apparently still covered in part the whole sac. It was very much thinner, however, over the major portion of the sac than it



Fig. 3.—Microphotograph of section of placenta of Twin B. Normal premature placenta.

was at one pole. On opening the sac there was found a well-formed fetus 12.5 cm. from crown to buttocks. There was no suggestion in any way of maceration and the muscles suggested excellent tone. Head appeared normal. Both eyelids were formed; closed but could be separated. Nose and mouth appeared normal. Ears were fully formed. Legs were flexed on thighs. Both forearms were flexed on arms. Chest and abdomen appeared normal. Insertion of umbilical cord appeared normal, length of cord was 22 cm. and width about 0.7 cm. Sex was male. Section of placental tissue appeared normal; showed no evidence of fibrosis.

Microscopic Examination: (Fig. 3.) Sections showed well-preserved decidua containing masses of fibrin. Moderate number of polymorphonuclear leucocytes was present throughout the decidua. In certain areas these leucocytes appeared more numerous than usual. In addition, small areas of hemorrhage were present. Adjacent to decidua were numerous chorionic villi. The epithelium surrounding these villi was well preserved and for the most part consisted of single layer of cells. The covering epithelium appeared mainly of syncytial type but appeared to be undergoing

present at the time of the examination. The estimated date of confinement was December 23. Spotting continued during July and the uterus increased in size to about that of a 4 months' pregnancy as noted on July 23. The uterus remained stationary during August, and on the twentieth a diagnosis of dead fetus was made. No further growth had taken place on September 10, in fact, the uterus seemed smaller. Intermittent spotty bleeding continued during all this time. The patient was told that the fetus was dead, and she was asked to return in two weeks. On September 24 she reported that she had felt definite movements two days before. The uterus was found to have enlarged almost to the umbilicus. Pregnancy progressed normally from this date, the patient going into labor spontaneously on Feb. 14, 1935, almost two months after the original estimated date of confinement. She was delivered by low forceps and median episiotomy of a normal male child weighing 6 pounds, 2 ounces. Inspection of the placenta and membranes showed nothing unusual in the membranes. On the fetal surface of the placenta (Fig. 4) near the margin was a small rounded flattened white mass, about 1 cm. in diameter, which lay beneath the amnion and was movable to a limited degree. Section of this mass (Fig. 5) showed a mass of rather hyaline connective tissue. The periphery was



Fig. 5.—Section of small mass noted between amnion and chorionic plate. Made up of hyalinized connective tissue. Periphery filled with round or oval calcified masses.

filled with rounded and oval calcified bodies, the center was free from these. This may represent the remnants of a small calcified ovum.

Two explanations can be offered for this peculiar clinical history: One, that this patient had a sixty-day amenorrhea preceding her pregnancy; that she then had a twin pregnancy and that in July one of the twins died. The other explanation involves superfetation, the first pregnancy preceding the second by two months, and its development ceasing during the early stages of the second pregnancy. In both explanations the stationary uterus would be caused by the collapse and shrinkage of one sac and the growth of the other.

In order for superfetation to occur one must believe that ovulation, fertilization, and nidation can occur after a pregnancy has been established in the uterus for at least a month. Fertilization should be possible until about the third month when the uterine cavity is obliterated by the fusion of the decidua vera and the decidua reflexa. Transportation of the fertilized ovum to the uterus can take place and is shown to be even more rapid in the pregnant than the nonpregnant rabbit according to Snyder and Wislocki.²⁹ Nidation should be easy in the

American Journal of Obstetrics and Gynecology

VOL. 31

MAY, 1936

No. 5

IN MEMORIAM

CHARLES JEFFERSON MILLER

1874-1936

THIS distinguished surgeon died suddenly at his home in New Orleans on the morning of March 21. A coronary thrombosis suffered some two weeks before, was the cause of his premature death at the age of sixty-two.

The sad news came as a great shock to our medical world, for during the winter his customary activities had been maintained, and none could guess that his useful life was so near its close. A useful life indeed, one of great professional distinction, and of a wide and far-reaching beneficence!

Jeff Miller was a "Southern Gentleman" in the highest acceptance of that term; a fact ever modestly revealed in his carriage, his manners, and his speech. Courteous he was, downright and courageous.

He was born in the South, at Winchester, Tennessee. He was educated there and afterward at Terrill College, University of the South, at Sewanee; finally taking his degree in Medicine from the University of Tennessee. As he was then one of the youngest, he afterward became one of the most distinguished graduates of this school. It can truly be said of him that he was a brilliant student all his life—not only of medicine, but also of men and affairs.

Shortly after graduation, he settled in New Orleans, and it was in that city he spent the forty-two working years of his life.

From the beginning, Jeff Miller proved himself an admirable exponent of his profession, and notably in his chosen field of obstetrics and gynecology. Appointments of various kinds, both clinical and academic, followed in rapid succession, and he soon became known as a skilful and reliable surgeon, with a conspicuous *flair* for teaching and administration. And we may add that this rapid promotion was entirely self-earned, due solely to the qualities of the man himself.

In a recent paper Snyder and Wislocki³⁴ have shown that a physiologic inhibition to ovulation during pregnancy definitely exists. They found that in the non-pregnant rabbit the injection of 0.1 c.c. of concentrated pregnancy urine sufficed to produce ovulation. In the pregnant animal doses 20 to 40 times as great (2 to 4 c.c.) were required to obtain this result. In addition it was found that it was very difficult to produce ovulation at all during the first four days of pregnancy. Coitus occurs rarely during pregnancy in the rabbit but in the few cases observed, no evidence of ovulation could be found. Autopsy on the animals injected with these large doses after the fourth day of pregnancy showed two sets of ova. The tubal set was unfertilized, the uterine set was encountered as developing blastocysts. In no case was the second set fertilized. This, they believe, corroborates the previously mentioned work of Hammond and Ansell showing the short duration of fertility in the sperm. They succeeded in fertilizing the second set of ova by artificial insemination and recovering both sets of ova at autopsy. Therefore these observers have produced superfetation experimentally in the rabbit. Snyder³⁵ in 1934 published further work on artificially produced ovulation during the latter part of pregnancy in rabbits. While this work has no relation to superfetation it is mentioned because of its interest. The duration of pregnancy in these animals is about thirty-two days. Ovulation induced on the twenty-fifth day of pregnancy regularly produced one of two effects. The rabbit either aborted within one to two days a fresh unmacrated set of fetuses or carried the pregnancy past term to about the fortieth day or fifteen days from the time of injection about corresponding to the duration of the corpus luteum. The fetuses were definitely postmature.

The facts that have been outlined show that ovulation in the human being during pregnancy is unlikely. The work of Snyder and Wislocki³⁴ puts on a firm basis the fact that ovulation can be induced with difficulty during pregnancy in the rabbit and that a definite physiologic inhibition exists. The nature of this inhibitory mechanism is unknown but it seems more than likely that such a mechanism must exist in the human being.

In a spirit of pure speculation, may not this inhibitory factor in the human being be present in the pregnancy hormone itself? This hormone, peculiar to the human beings and the great apes, reaches its greatest concentration at the end of the first month of pregnancy or at about the time when the next ovulation should occur. The effect of the administration of large doses of this hormone on the ovary has been noted by several observers. This effect is vastly different in human beings and monkeys from that in the rodent.

Engle³⁶ in 1933 found that this hormone injected into macaque monkeys produced instead of follicular growth, a cessation of ovarian activity, with atresia of large follicles and hyalinization of small follicles. This result corresponds closely with the appearance of the human ovary in pregnancy. Geist³⁷ noted no follicular growth or luteinization but rather arrest in follicular development in ovaries obtained from patients treated with pregnancy hormone ante-operatively. Recently an ovary, obtained from a patient receiving massive doses of pregnancy hormone before operation, was examined. Marked congestion was present together with retrogressive, atretic changes in every follicle. Engle³⁸ feels that if pregnancy hormone produces such an effect in all likelihood it is an indirect one. He has demonstrated that the injection of pregnancy hormone produces a degranulation of the basophile cells of the anterior pituitary. In this way there is produced pre-

Jeff Miller traveled widely, read extensively, and wrote much. It was in this way that his holiday was spent. Games of any sort, even the doctors' special recreations of golf and bridge, had small attraction for him.

Though he spoke of himself as a "stepchild of modern medicine, a mere clinician," his contributions to the science and practice of medicine were many and varied; and the communications themselves were all stamped by clarity, wisdom, and sound sense. Few men could so happily open or close a discussion.

The textbook *An Introduction to Gynecology*, published in 1931, is now in its second edition. Designed for the use of students, it is replete with sane advice, the result of accurate observation and of ripened experience.

His work was, of course, the large center of his life, nevertheless there was a wide circumference of interest in other things. There were the qualities of the artist in him; these specially manifest in his choice of reading, his love of music and beautiful things, and his literary gift. It is not too much to say that his "lay" addresses have been equalled by few in our profession. And last of all, the "High Gods" had endowed him with a great personal charm and a veritable genius for friendship.

C. Jeff Miller was a tower of strength to his profession; and in the wider world he will be long remembered as "a man ripened in wisdom walking as a physician."

Walter W. Chipman.

To this sincere tribute by a friend and colleague, the Editors desire to add and record their appreciation of Dr. Miller's constant interest and loyal support of the JOURNAL. He honored the Advisory Board as a member from its inception and was always ready and willing to give his advice and suggestion; he contributed many notable articles to the pages of the JOURNAL and stimulated the various members of his staff to do likewise. Dr. Miller's culture, his high literary ability, and his scientific attainments made his many and varied papers outstanding contributions to American medical literature. Dr. Miller was one of those rare characters whom it was a pleasure to have known and with whom it was an honor to have been associated.

George W. Kosmak.

Hugo Ehrenfest.

THE TOXEMIAS OF PREGNANCY*

IV. THE CARBOHYDRATE METABOLISM

ALLAN WINTER ROWE,[†] PH.D., MARY A. McMANUS, A.B., AND
ALBERT J. PLUMMER, M.A., BOSTON, MASS.

(From the Evans Memorial, Massachusetts Memorial Hospitals)

IN PAPERS which have previously appeared the authors have considered certain of the results of an elaborate clinical and laboratory study on a group of fifty pregnant women, all of whom presented some form of the toxemias which may be associated with this physiologic state. The first paper¹ dealt with the demonstration of an hepatic factor in a very considerable portion of the group, while the second communication² analyzed the nitrogen metabolism before and after delivery.

The present paper deals with a survey of the carbohydrate metabolism during gestation and in the period immediately following delivery. It has long been recognized that during even normal pregnancy various indices appear of changes in the levels of sugar utilization, and naturally during the period of lactation an entirely new mechanism is in operation with the end-result of lactose synthesis presumably mediated by the mammary glands. Further, it is equally probable that the same or like agencies are concerned with the transformation of blood glucose into galactose as one essential preliminary step in the building of milk sugar. Normal performance presents a definitely different picture for the pregnant and lactating female from that offered by the adult woman in a state of sexual rest. The criteria of normality in pregnancy have already been established by investigation, and have been summarized elsewhere by one of us.³ The principal data were derived from the observation of a series of normal women studied throughout their pregnancies and for some weeks thereafter. These figures will be drawn on freely for control material. In addition, as, in the group of conditions loosely gathered together under the general caption of "toxemia," clear-cut evidences of a renal or an hepatic pathology or both may present, similar records have been compiled from two series presenting severally these two conditions (unpublished data from other investigations) in uncomplicated forms. From comparison with them, some further light may be thrown on the mechanisms underlying the carbohydrate anomalies. Finally, a last series of studies from women with functional or organic (castration) failure

*Presented before the Biochemical Section of the American Chemical Society, Washington, March 27, 1933.

[†]Dr. Rowe died on December 6, 1934.

This tendency to bleed cannot be the cause of the abruptio placentae, because we have observed four cases of pregnancy complicated by purpura hemorrhagica and there was no evidence at any time of a premature separation of the placenta.

A number of cases of anuria or oliguria associated with abruptio placentae also have been reported, and in many instances the suppression of urine caused the patient's death. The autopsy indicated that the anuria in a number of these patients was due to a cortical necrosis of the kidney. Ash contends that the cause of the cortical necrosis was an angioneurotic edema. Seriver and Oertel believe that the necrosis is the result of a terminal arterial segmentary collapse (vasoparalysis), with blood stasis and segmentary thrombosis.

In 1933, Ash collected 64 cases of cortical necrosis of the kidney. We have been able to add 14 more to date; several of these cases had been overlooked by Ash. Fifty-six of the 78, or 72 per cent, were associated with pregnancy. In 26 of the 56, or 46 per cent, the necrosis was associated with an abruptio placentae. Pregnancy was uneventful before the onset of the anuria in only 11 of the entire 56 cases. Authentic cases have also occurred in men. Sheehan reported several cases in men who worked in an ammunition factory.

Davis and McGee, as well as other authors, divided their cases into mild or partial (occurring usually near the end of labor), and grave or complete abruptio placentae (occurring most frequently before the onset of labor and associated in many cases with the Couvelaire type of uterus). In their series, 57 per cent of the patients had evidence of toxemia. Reports by other investigators state that from 24 to 100 per cent of the patients were toxemic.

The English obstetricians for many years have been classifying their cases into the toxic and nontoxic groups. The criteria for the former group have been the occurrence of one or all of the following signs: Edema, albuminuria, or hypertension. Kellogg has pointed out the connection between the kidney and certain cases of abruptio placentae. He was able to select a number of cases from a group of patients with separated placentas, which he called the "nephritic group." These patients, he stated, were generally characterized by relatively moderate parity. The nonnephritic group were older women, stringy, worn, and multiparous. He thought that an endometritis might be the main etiologic factor. High white counts were noted in both groups. Some of these patients also showed an increased bleeding and coagulation time. He stated that anuria in cases of abruptio placentae is a complication to be feared, and reported in detail a case associated with hypertension, anuria, and blood nitrogen retention. The patient received 22,560 c.c. of fluid and excreted only 634 c.c. of urine in five days. The nonprotein nitrogen rose to 120 mg. per cent during this period, but fell rapidly as the volume of urine increased.

The diagnosis of chronic nephritis in the majority of the reports always has been based on the presence of albumin in the urine. This is not correct because its presence does not necessarily indicate that the patient has nephritis. Furthermore, Brown has demonstrated that shortly after the abruptio placentae has occurred, whether it is of the revealed or concealed type, albumin appears in the urine. Likewise, in comparing the few cases in which blood analyses were made and, more

after a meal will usually give a positive test as the result of glycuressis, but this leakage through the kidney in appreciable quantities of partly unidentified reducing bodies is, at best, a transitory phenomenon and the accumulations at these periods are so diluted in the complete twenty-four-hour collection as to render the latter negative to conventional qualitative testing. The appearance of sugar in detectable amounts in such a twenty-four-hour collection is to be regarded as abnormal and an evidence of disturbance in the carbohydrate metabolism. That such abnormality is the end-result of a myriad of not necessarily related causes is too well recognized today to require more than passing comment. The urine findings in the several groups under consideration have been collected in Table II.

TABLE II. GLYCOSURIA (TWENTY-FOUR-HOUR COLLECTIONS)

GROUP	STATUS	URINE + PER CENT	COMMENT
A. Pregnant, toxic	3 to 9 mo., a.p.	16	Glucose
	10 to 14 days, p.p.	50*	{ Glucose Lactose
B. Pregnant, normal	4 to 9 mo., a.p.	18	Glucose
	14 days, p.p.	82	Lactose
	6 mo., p.p.	80	Lactose
C. Hypogonad	—	25	Glucose
D. Hepatic dysfunction	—	18	Glucose
E. Cardiorenal	—	6	Glucose

*Average duration of pregnancy

+ = 8.7 months

0 = 7.8 months

During the period before delivery, the incidence of glycosuria is substantially the same in both the toxic and normal pregnant women. The normal figure here is somewhat higher than the usual report; our studies call for repeated examinations (over 700 in this group), a fact which explains the seeming discrepancy. Fourteen days after delivery, 82 per cent of the normal pregnant women show lactose in the urine; this is patently the common finding and presumably represents no more than a combination of overproduction coupled with the limited capacity of the organism to utilize this sugar when the integrity of the disaccharid molecule is unimpaired.

Turning to the toxic group, the incidence of melituria postpartum is appreciably lower than in the normal group. Further analysis of the detailed data of each case shows that the positive group were approaching normal term at the time of termination of the pregnancy. On the other hand, the negative series contain a number of cases with early miscarriage or therapeutic abortion, the pregnancy terminating before the mechanism of lactation had been established. Naturally, individual cases vary, this no more than the normal and anticipated fluctuation of physiologic function, but the relative duration of the two groups as given in the table offers a reasonable explanation for

In the toxemic group, 20 per cent were over thirty-four, while in the nontoxemic group, 39 per cent were over thirty-four years of age.

In Group A, 14, or 35 per cent, were primiparas, as contrasted with the other group in which there was only one primipara.

Urinalyses were made for the presence of albumin in 28 cases in Group A, and three cases in Group B. It was found to be present in all of them. Similarly, edema, more marked than that for normal pregnancy, was noted in 18 of the toxemic, and in none of the nontoxemic group.

In Group A there was a previous history of a toxemia of pregnancy in nine cases; in Group B there was none.

A marked anuria or oliguria was noted in three patients, but the use of blood transfusion and parenteral fluids cured these findings and probably acted as a valuable prophylactic against the suppression of urine in the others.

To summarize, a division of cases on the basis of the height of the blood pressure reveals additional significant differences between widely separated conditions. A comparison may be made in the period of gestation, fetal mortality and weight, age of the patient, parity, albuminuria, edema, and previous history of toxemia. It is apparent that there are two types of abruptio placentae, a vascular, hypertensive or toxemic type and a nontoxemic type. In either group the separation of the placenta may be partial or complete, the hemorrhage internal, external or combined, and the symptoms and signs may be mild or severe.

There was no maternal mortality in these 58 patients. One private patient died of a rupture of the uterus and was not included because of a difference in opinion as to the diagnosis of abruptio placentae.

In Table I are listed the systolic and diastolic blood pressures of both groups for various periods before and after delivery. Many of the patients in Group A, in spite of the shock, had a definite hypertension. In a number of them, although the systolic blood pressure was above 100, there is a tremendous drop if the post-

TABLE I. BLOOD PRESSURE IN MILLIMETERS OF MERCURY

RANGE	TOXEMIC			NONTOXEMIC	
	ADMISSION	POSTPARTUM		ADMISSION	POSTPARTUM
		10 DAYS	3 MONTHS		
Systolic					
70-99				4	2
100-139	12	10	17	13	8
140-149	7	4	1		1
150-169	8	10	1		
170-199	9	6	2		
200-229	4	2	1		
Diastolic					
20-59		1		3	1
60-79	5	4	10	10	7
80-89	5	8	5	2	2
90-99	10	4	2	2	
100-129	17	14	4		
130-159	3	1	1		

A few words of explanation are required. Groups I, II, and III in the toxic series all had established or probable hepatic factors in the etiologic complex. Group IV alone of these subdivisions gave no objective evidence of a liver complication. This might account for the somewhat higher value both ante- and postpartum which offers a modest contrast to the other antepartum levels. That pregnancy produces low normal blood sugars is a well recognized fact. So strong is this influence that in a group of patients studied actually after labor was well under way,⁶ the average for the group was 82 mg., in other words, slightly, and not significantly, below the lowest level recorded here. The quick recovery postpartum to normal levels coupled with the equally normal averages of the other control groups offers convincing evidence that the low normal blood sugar of pregnancy is a phenomenon intrinsic in the physiologic status and disappears once the exciting cause is removed by emptying the uterus.

To summarize the blood evidences briefly, toxemia in the pregnant woman produces no change in the blood sugar levels which would differentiate these several states from that of normal gestation.

Turning next to the third, and in some ways the most decisive of the evidences of the level of carbohydrate metabolism, we consider the approach by provocative melituria. The selection of sugar for the test meal is a question of primary importance. For many years past, one of us has been studying the utilization of galactose in man in a wide variety of physiologic and pathologic states. In a similar manner, we are now investigating levulose by the same methods and in the same wide scatter of normal and abnormal physical conditions. The third common hexose, glucose, has as yet not been included in this program of study, since it is less well adapted for certain types of approach than are the other two. For one reason alone, the normal tolerance is so high that its verification by the administration of the test meal to the fasting patient not infrequently produces gastrointestinal disturbances that drastically terminate the test. Its use in those conditions where tolerance is actually increased produces an augmentation of the initial difficulty and appreciably lowers the percentage of successful tests.

The highly controversial topic of tolerance testing as such need not be discussed further as the present thesis is concerned solely with the presentation of certain objective results obtained under sharply defined conventions of performance. Briefly, the sugar is administered to the fasting and resting patient, usually at 7 A.M. and after the collection of a two-hour control urine. Subsequent two-hour urine collections are made at 9 and 11 A.M., and all are tested qualitatively for the presence of reducing material. In event of a positive response, the amount present is quantitatively determined. In galactose testing, if the control specimen shows the presence of glucose, the subsequent

difference and were, therefore, grouped together. It is worth noting that a number of the determinations on admission were below 6 gm. per cent and even after delivery and blood transfusion a number were still low. A considerable amount of serum protein is lost with excessive hemorrhage, and although there is a reserve supply in the tissues, if the hemorrhage has been excessive or protracted, the concentration of serum protein may reach a level at which proper interchange of fluids in the tissues cannot occur. The result may be the formation of edema and oliguria, or if acute, shock and death.

In Table V are listed the concentrations of fibrin. Both groups are again placed in one table because there were no significant differences between them. The normal concentration of fibrin in pregnancy at twenty-six to thirty-six weeks ranges from 0.280 to 0.580 gm. per cent, with an average of 0.430 gm. per cent. The number of patients with subnormal concentrations of fibrin is striking.

TABLE V. FIBRIN, GRAMS PER CENT, BOTH GROUPS

RANGE %	ADMISSION	POSTPARTUM 1-2 DAYS
0.010-0.049	3	
0.050-0.099		
0.100-0.149	2	
0.150-0.199	2	
0.200-0.299	1	3
0.300-0.399	3	2
0.400-0.499		4
0.500-0.599		1

In Table VI are listed the blood nonprotein nitrogen for both groups. Although the series is small, the number of patients in both groups with a nonprotein nitrogen of more than 40 mg. per cent, is striking. The average for pregnancy is 25 mg. per cent.

TABLE VI. BLOOD NONPROTEIN NITROGEN, MILLIGRAMS PER CENT

RANGE	TOXEMIC			NONTOXEMIC	
	ADMISSION	POSTPARTUM		ADMISSION	POSTPARTUM 1-10 DAYS
		1-10 DAYS	3 MONTHS		
15-19					1
20-29	2	6	12	3	3
30-39	1	6	8	1	4
40-49	2	1	1	3	1
50-54		1			1

In Table VII are listed the urea clearances in per cent of normal for both groups. The majority of the figures are more than 50 per cent, which we have taken as a lower limit of normal. The average for Group A is less than that for Group B.

TABLE VII. UREA CLEARANCE, PER CENT OF NORMAL TEN DAYS TO ONE YEAR AFTER DELIVERY

RANGE	TOXEMIC	NONTOXEMIC
30- 49	6	
50- 69	10	5
70- 89	7	1
90-109	4	2
110-139	3	2
Average	73	83

TABLE V. GALACTOSE TOLERANCE

GROUP	STANDARD NORMAL	OBSERVED TOLERANCE		
		DEPRESSED	NORMAL	INCREASED
A. Pregnant, toxic				
antepartum	20-30	25%	64%	11%
postpartum	20-40	42%	56%	2%
B. Pregnant, normal				
antepartum	20-30	0	100%	0
postpartum	20-40	0	100%	0
C. Hypogonad	40	100%	0	0
D. Hepatic dysfunction	30-40	91%	7%	2%
E. Cardiorenal	30-40	46%	52%	2%

Brief analysis of the data shows the following:

As the study of the normal pregnant woman defines the normal response to the sugar, the 100 per cent record is inevitable. The ovarian failure cases all show a depressed galactose tolerance as one of the many diagnostic points, the summation of which defines the underlying etiology. The hepatic group, as might well be anticipated, shows a dominant downward tendency. A few normal cases are recorded, and two of the series show that rare condition of an increased tolerance which has already been recorded elsewhere.⁷ The cardio-renal group shows a downward tendency, the incidence of depressed tolerance being in excellent agreement with the figures of O'Hare⁵ already noted. The single case with an increased level showed a significantly lowered renal permeability to which fact this anomalous result is probably attributable.

Turning now to the toxic series, a very real scatter of results appears. This presumptively does no more than express the algebraic summation of the several factors of influence which these patients exhibit. Two-thirds are normal ante- and one-half postpartum. The abnormal responses are generally in the direction of a lowered tolerance. Several antepartum and one patient after delivery, however, show the anomaly of an increased utilization capacity. Further detailed analysis of this group is given in the next table. As this analysis calls for the use of the four subgroups already noted, they may be briefly defined.

In Group I, an hepatic factor was objectively demonstrated and a renal element denied with equal authority. Group II showed both hepatic and renal involvements by objective methods of approach. In Group III, the hepatic element was probable but lacked final confirmation; renal abnormality was excluded. In Group IV, as already noted, there was a renal but no liver component.

In the antepartum period, the liver factor causes a significant deviation from the normal in nearly half the cases. After delivery, the normal moiety is substantially unchanged but practically all of those departing from this standard show a depressed tolerance. With Group

Williams, Willson and others believe this condition is due to a toxin originating either in the placenta or the fetus, which injures the vessel wall, resulting in hemorrhage and preventing clotting of the blood. This theoretical toxin, according to them, has properties similar to those found in the venom of some of the vipers. A more reasonable explanation is that if a normal process of degeneration of the vessel walls and endarteritis is occurring in the uterine wall, plus vascular disease, rupture and/or thrombosis of a vessel producing hemorrhage or infarction are quite likely to occur.

The prolonged bleeding time seen in some cases is probably due to the marked decrease of the blood fibrinogen. There are several possible explanations for this decrease. The blood fibrin can be reduced markedly by blood loss. Whipple and coworkers, and McMaster and Drury have demonstrated that plasmapheresis will cause a marked decrease in fibrin which, if it is continued long enough, renders the blood incoagulable. However, within a period of hours or a day at the most the blood fibrin returns to normal. The second possibility is that with the hemorrhage, fibrinogen may be mobilized at the site of the bleeding, and if the latter continues for any length of time, it may be possible for the blood fibrin to become abnormally diminished. Thus an example of mobilization is the low fibrin concentrations reported in cases of pneumonia with exudate. Here the fibrin is mobilized in the pleural effusion. A third possibility is that the low fibrin may be the result of liver damage. Whipple and coworkers have shown that the liver is the primary site of fibrin formation and that after prolonged chloroform anesthesia or other toxic agents which cause liver necrosis the fibrin decreases, and in some cases the blood actually becomes free of it. Likewise, after removal of the liver there is a fall in blood fibrinogen and, within twelve to twenty hours, from 20 to 50 per cent have disappeared from the blood. In all of these cases of abnormally low fibrin, hemorrhage from the mucous surfaces and incisions occurs. The low concentration of fibrin found in some cases of abruptio placentae is probably caused by an actual loss due to the hemorrhage and a mobilization of fibrin at the area of the placental separation.

The hemorrhage causes a loss of hemoglobin, serum protein and fibrin from the body. The immediate effect of hemorrhage has been discussed by Dieckmann and Daily, but the salient points which should be emphasized are that it requires day or weeks for the regeneration of hemoglobin and serum protein. With abnormally low hemoglobin and serum protein concentrations the tissues suffer from anoxemia and the proper interchange of water and salts cannot take place. In a few cases the serum protein concentration had been decreased to such a degree that the life of the patient was endangered.

We believe the anuria is due to a spasm of the renal vessels and also to a lack of available water for renal excretion caused by the hemor-

trend. Until numbers confer more authority on proposed standards, we prefer to record limits, as has been done above, and then report observations in absolute rather than relative terms. Once standards are established, these records can be readily translated into terms of deviation.

The values for the normal and toxic pregnant woman are given in the next table, using this convention. Here, too, the series are brief, and larger numbers will presumably modify the absolute arithmetical magnitudes. We doubt, however, if they will significantly change the trends here recorded to any considerable degree.

TABLE VIII. LEVULOSE TOLERANCE IN PREGNANCY

DOSE	ANTEPARTUM		POSTPARTUM	
	NORMAL	TOXIC	NORMAL	TOXIC
25	0	17%	0%	7%
50	44%	38%	27%	52%
75	22%	38%	55%	27%
100	}	}	}	}
Over 100				
	34%	7%	18%	7%

Considering first the normal group, one finds one-third of the series falling within the range tentatively assigned to the healthy woman in a state of sexual rest. One-fifth show a depression to the level similarly ascribed to childhood, while nearly half are below this boundary which, with galactose as the test sugar, forms the limit of normal depression. The postpartum figures show a tendency toward concentration at the 75 gm. level, although significant representation is recorded in the moieties both above and below.

Turning to the toxic series, it is evident that the whole trend is downward. For example, 17 per cent are at a level (25 gm.) lower than any of the normal group. Further, while two-thirds of the normals are positive with 75 gm. or less, 93 per cent of the toxic cases fall within this range. After delivery the same tendency is manifest, both in the 7 per cent still positive with 25 gm. and in the concentration of half of the group at 50 gm. instead of the 75 gm. level of the normal series. Toxicity certainly lowers the utilization power of the pregnant woman for levulose but scarcely to a degree that might be inferred from her double burden nor yet with a certainty that admits of no exception. Broadly speaking, levulose follows the trends already noted with galactose but in a qualitative rather than a quantitative sense. Further, there are certain lacks of correlation between the evidences with the two sugars that emphasize the differences probably intrinsic in the individual mechanisms of utilization.

One more line of approach may be attempted in an effort to sharpen the clarity of the indications with this sugar. Expressing tolerances in terms of the averages of the positive doses for the several groups

tions during the third trimester, or premature labor should always suggest vascular-renal disease, providing the Wassermann reaction is negative.

The data presented in Table VIII illustrate some of the changes in the chemistry and also the management of a case of abruptio placentae. In spite of the large amount of blood and parenteral fluids which were administered, an anuria almost occurred, and there was no increase in the hemoglobin concentration, and the serum protein content was subnormal.

The renal function after delivery in a number of cases was markedly impaired, but in a period of months it returned to normal. Thus if the figure for the clearance obtained at ten days and three months or more are compared, it will be noted that a clearance of 38 per cent was increased to 72 per cent; of 15 per cent to 99 per cent, and of 51 per cent to 125 per cent. However, the reverse also occurred. Thus the clearance in one case decreased from 89 to 45 per cent, in another from 78 to 50 per cent, and in still another from 75 to 52 per cent.

The patients in the toxemic group almost always had evidence of toxemia in subsequent pregnancies; the premature separation or placental infarction was likely to recur or abortion or premature labor occurred. Our data are inconclusive, but we have a definite impression that abruptio placentae predisposes to lowered fertility.

SUMMARY

1. Patients with abruptio placentae may be divided into a toxemic, hypertensive, or vascular disease group and a nontoxemic group. In the former the majority of the cases are associated with a persistent hypertension, which may have been initiated or intensified by the pregnancy rather than with a true preeclampsia and eclampsia. The nontoxemic group is associated with local conditions in the uterus. These may be subinvolution due to multiparity or infection, abnormal implantation, faulty contractions of the uterus, etc.

2. The hemoglobin, hematocrit and serum protein concentrations are lowered proportionately to the hemorrhage. If the loss of these substances is great enough, death may occur as a result of tissue anoxemia and improper interchange of water and electrolysis.

3. The determination of the hemoglobin and serum protein concentration on admission does not, as a rule, give a true index of the volume of the hemorrhage or of the patient's condition.

4. The systolic blood pressure on admission may be 100 mm. or more, and yet the patient may be in shock.

5. The blood fibrin may also be reduced to a concentration which predisposes to bleeding from mucous surfaces, incisions, and the uterus.

REFERENCES

- (1) *Rowe, A. W.*: J. A. M. A. 99: 2083, 1932. (2) *Rowe, A. W., McManus, M. A., and Riley, G. A.*: J. Lab. & Clin. Med. 19: 923, 1934. (3) *Rowe, A. W.*: AM. J. OBST. & GYNEC. 21: 644, 1931. (4) *Rowe, A. W.*: Endocrinology 15: 481, 1931. (5) *O'Hare, J. P.*: Am. J. M. Sc. 160: 366, 1920. (6) *Rowe, A. W., and McManus, M. A.*: Proc. Soc. Exper. Biol. & Med. 31: 32, 1933. (7) *Rowe, A. W., and McManus, M. A.*: Am. J. M. Sc. 181: 777, 1931.

80 EAST CONCORD STREET

BEHAVIORAL CONSEQUENCES OF CEREBRAL BIRTH LESIONS*

EDGAR A. DOLL, PH.D., VINELAND, N. J.

(Director of Research, The Training School)

FORTUNATELY, the hazards of birth, for both mother and child, have been greatly reduced by modern programs of prenatal care and increased attention to obstetric details. The number of children injured at birth is remarkably small in the face of the possibilities for morbid consequences. Adequate statistics are not available, but probably less than three surviving children per thousand are seriously affected by congenital palsy, and probably less than one-third of these are also mentally subnormal.

Some of these "injuries" are the result of developmental anomalies or maternal diseases during pregnancy. Others are due to imperfect or incomplete development of the child at birth. In still other cases anatomic or physiologic complications in the mother endanger the infant beyond the protective limits of modern obstetric skill. The attending physician carries a heavy burden of responsibility even in an uncomplicated delivery. That these responsibilities are discharged with the utmost fidelity, and with ever increasing skill and concern, is witnessed by the relatively small number of untoward consequences in the face of the many difficulties encountered.

There are many types of organic nervous lesions in childhood which produce mental subnormality or motor paralysis. Among these, the neuromuscular incoordination of intracranial birth palsy is fairly distinctive, yet not very generally differentiated for purposes of treatment. Formerly thought of as orthopedically hopeless, these "spastics" have lived their isolated lives as helpless burdens. More recent knowledge discloses that the mental condition of such children is more commonly hopeful than hopeless, and their physical handicaps of speech and movement do yield to well-considered orthopedic treatment.

*Read at a Symposium on Birth Injuries for the Philadelphia Obstetrical Society, November 7, 1935.

cident as the cause. Braxton Hicks, about 1865-70, stressed the fact that the hemorrhage of premature detachment was "concealed." Goodell, in 1880, by the caption of his thesis accentuated the fact of concealment. As a result, in the years thereafter, if the bleeding was entirely concealed it was a case of detachment of the normally situated placenta; if external bleeding occurred the case was probably a high lateral placenta previa. The third error arose when the term "abruptio placentae" was coined, for nowadays clinicians are looking for a violent, sudden onset. In 1899, after debating the matter with professors of Greek and Latin in the University of Chicago, it was agreed that *ablatio placentae*, or *placenta ablata* expressed graphically the clinic entity.

I am still convinced that etiologically there are three types of ablatio: first, one due to an injury; second, one due to pathologic alterations of the uteroplacental union; and third, one due to some toxemia. My conviction is that the poisonous element is not closely allied to the eclamptic poison, each of these poisons having a peculiarly selective power. My inclination is to hold that the third cause, probably, is the most frequent etiology.

DR. DIECKMANN (closing).—Dr. McGoogan very kindly emphasized some points which I neglected to state. In regard to the type of vascular disease, it must be a different type from what we see in eclampsia. Whether you want to call it a chronic nephritis, vascular disease, or hypertension does not make a bit of difference except we should agree on what we mean by these different things. In the last few years I have accepted the internist's point of view that chronic nephritis does not mean chronic glomerulonephritis.

In regard to purpura, I have seen four cases in pregnancy, none of the patients having abruptio or bleeding.

I like the term *ablatio placentae* better than *abruptio*, but I like *premature detachment* better than either of the two.

With regard to the control of hemorrhage, I may say that the patient whose chart I showed had 1,400 c.c. of clotted blood and continued to bleed. I operated upon her myself and she had a Couvelaire type of uterus. We usually remove the uterus in women who have had several children. I had to remove the uterus by supravaginal hysterectomy about five hours after the cesarean.

Jones, Rathmell, and Wagner: The Transmission of Syphilis by Blood Transfusion, *Am. J. Syph. & Neurol.* 19: 30, 1935.

The procedure of blood transfusion should be carried out by competent and well-trained men. Institutional work should be guided by a physician who is qualified and who should insist upon a minute examination of blood donors at frequent intervals for the presence of a syphilitic infection. There should be available at all times the facilities of a laboratory wherein the common serologic examinations of donor's and recipient's blood for the presence of a syphilitic infection are conducted. This examination should be made on the day of transfusion. Laboratory reports should be written, not telephoned, given to residents verbally, or relayed to nurses. Such reports should be made by a competent technician and should be attached to the patient's records at the time of transfusion. No physician should consider the transfusion of blood, except in the gravest emergency, unless the donor gives a history, physical examination and laboratory tests which are all negative for syphilis.

The authors do not agree with the statements of observers who feel that inactive syphilis may not be transmitted. All syphilitics are potential transmitters.

groups, such that the corresponding movement is performed only with difficulty and with consequent delay.

Athetosis, on the other hand, reflects an interference of involuntary movements superimposed upon fairly well-coordinated voluntary movement. The intended movement is therefore disturbed by irrelevant muscular activity, often accompanied by "overflow" into functionally unrelated muscle groups. This is apparently produced by an imperfect selective action of the different muscle groups and results in poor control, with fairly rapid movement.

Mental subnormality frequently accompanies the motor handicaps which arise from birth injuries. It should be emphasized, however, that normality of intelligence is more common than subnormality. Indeed, there are many instances of striking superiority of intelligence in spite of the most severe physical handicaps. The expression of intelligence is rendered so difficult by the motor handicaps that the mental ability of these patients is often seriously underestimated. Moreover, the motor difficulties often prevent the early expression of an underlying mental capacity, so that the intelligence does not become functionally expressive until relatively late in life. Consequently, it is of the utmost importance that adequate mental examinations of these patients be made as early as practicable, in order to separate the mentally retarded from the mentally unaffected for purposes of education and training.

In contrast with those individuals who show severe paralysis without mental retardation, there are undoubtedly many mentally retarded children whose condition is due to birth injuries which do not produce accompanying motor disturbances. Recognition of these cases is difficult because the neurologic basis of the mental retardation cannot be demonstrated by present examination methods. Undoubtedly, many cases of idiosyncrasy, and probably many instances of milder degrees of mental retardation, could be traced to injuries at the time of birth if examination methods and the interpretation of history data were more precise. In the absence of motor symptoms these children are not easily distinguished from the ordinary feeble-minded.

There is good reason to suppose that birth injuries which affect the motor and intellectual systems may also produce disturbances of personality. It has been demonstrated that disturbances of behavior resembling psychopathic conditions are very commonly associated with histories of abnormal birth, and enough is known of the anatomy and physiology of personality to strongly suggest a presumptive relation between difficult birth and abnormal behavior.

At present we know of no reliable statistics regarding the frequency of birth injuries and their relation to mental subnormality. This is because the conditions at birth which might produce abnormalities of development cannot safely be assumed. It is necessary for diagnosis that

An analysis of the five-year results in these 27 cases showed that five could not be traced; two died before the five-year period had elapsed, one from postoperative embolism, and one from tabes. Seventeen of these patients had practically complete relief of their symptoms; and in three others there was only a small recurrent area that required merely local cauterization to bring about a cessation of symptoms.

In the ten-year follow-up of these cases we find 17 that come in this group, but during these additional years many were lost track of so that further data were available concerning only six patients. This made the record as follows: died 2; not traced in first five years, 4;

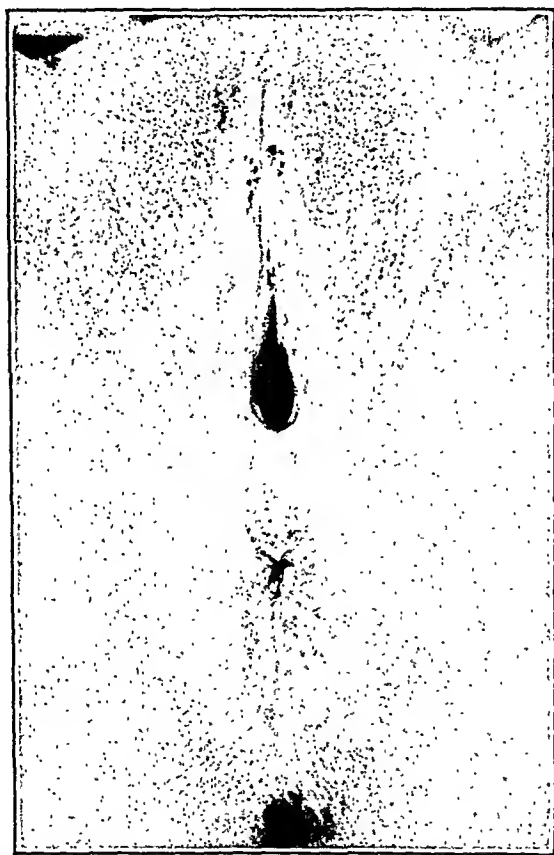


Fig. 1.—Leucoplakic vulvitis with kraurosis and involvement of a large area of perianal skin. This patient was operated by complete vulvectomy and removal of perianal skin leaving a bridge of tissue to either side laterally.

not traced between five and twelve years afterward, 5; cured for ten to fifteen years, 6. No failures were reported.

In the past five years I have had four patients upon whom it was necessary to do secondary surgical excisions for a recurrence. In two of these the recurrent lesions were in the vulvogluteal folds, and in the remaining two the perianal skin had developed a leucoplakic change.

In weighing in the balance the final results of vulvectomy in the treatment of leucoplakic vulvitis, we cannot deny that some of these patients complain of a disagreeable feeling of tightness about the vulval skin and

consultation with the physician be familiar with the clinical mental symptoms of birth injuries. He must also be especially skilled in the administration and evaluation of mental test procedures, and in the use of history data in collaboration with the orthopedist or neurologist. The motor handicaps of these subjects render mental examination especially difficult. Speech is very commonly affected and this, combined with the handicaps of manipulation, greatly limits the application of standardized mental tests that can be properly applied. The examiner must guard against being so sympathetic that he interprets the test results too liberally, and yet must be sufficiently alert not to penalize the child unduly for handicaps of expression. The mental prognosis must consequently be guarded and successive examinations will be needed to confirm the impression regarding intellectual development.

Whether mentally normal or subnormal, these patients are of particular interest to the special class teacher in the public schools. There is always some possibility that the apparently subnormal child with motor handicaps due to birth injuries may prove to be mentally normal. One serious problem is to discover such unsuspected ability and overcome the motor handicaps by instruction through special methods of education. If the child is receiving muscle training, it is of the utmost importance that such training be correlated with educational methods so that the motor progress can be capitalized for expressive purposes. Education must therefore provide motivation which is essential for increasing the child's confidence in his own abilities in spite of his neuromuscular limitations.

In spite of the apparent helplessness of these children, astonishing results can sometimes be obtained and the teacher will be encouraged by the enthusiasm and progress of the pupil. The results of such training are often so extraordinary, and so obvious, that they provide a powerful incentive for further effort, giving the teacher something of that compensation which the physician experiences as his patient progresses through the successive stages of convalescence. The most optimistic teacher tends to underrate the capabilities of birth-injured subjects. She often obtains unexpected results which lead to more enthusiastic effort.

A hundred years of observation, investigation, treatment and training of birth-injured subjects has brought us to a point where new light is shed on the conservation of these exceptional children in the public schools. The current interest in crippled children, and the experiences gained in training mentally subnormal children, provide an exceptional opportunity for the birth-injured child. Perhaps no class of handicapped children presents more difficult problems of remedial instruction. Yet no single group of children appeals so much to our sympathy and holds so much promise as these.

Simple vulvectomy according to Kehrer in Germany will yield from 3 to 6 per cent five-year cures, and irradiation treatment according to Stoeckel's summary of 126 cases with 15 cures will give us, even with present improved methods of treatment, only 12 per cent of five-year cures. In my opinion it is no longer a matter of debate what is the best method of treating carcinoma of the vulva. If in operable breast cancer, radical surgery with gland removal is unquestionably accepted as the best method of treatment, then the same should also apply to cancer of the vulva. In the 36 patients observed since 1929, there were only nine in whom extreme old age, general physical condition, or advanced stage of the disease made it impossible to carry out a radical surgical excision. It was the general physical condition of the patient rather than the extent of the disease that served as an operative contraindication. The remaining 27 patients were subjected to a Basset operation.

This brings the total number of complete Basset operations done up to the present time to 43 cases. In four additional patients lymph glands were removed only on one side, or the Basset operation could not be completed because of invasion of the femoral vein by the cancer. Once the subsequent microscopic examination after a double-sided Basset failed to confirm the original diagnosis of a carcinoma. These five cases have been left out of consideration in the present study.

I have divided these 43 patients into three groups: (1) those operated upon ten or more years ago; (2) those operated upon five or more years ago; (3) those operated upon less than five years ago. The results are tabulated below:

TABLE I

YEARS OF OPERATION	TOTAL NO.	OPERATIVE DEATHS	DIED RECURRENT IN FIRST 5 YEARS	DIED RECURRENT BETWEEN 5 AND 10 YEARS	DIED OF OTHER DISEASES BETWEEN 5 AND 10 YEARS	DIED AFTER 10 YEARS	LIVING AND WELL	NOT TRACED
1915-1925 (Oct.)	12	0	3	1	3	3	2	0
1925 (Oct.)-1930 (Oct.)	11	1	3	1	0	—	6 (One recently recurrent)	0
1930 (Oct.)-1935	20	1	3	—	—	—	15	1
Total	43	2	9	2	3	3	23	1

In the immediate results of this method of treatment it will be noted that there were two primary deaths, one on the ninth day from sepsis and one on the twelfth day after operation from embolus. It is worthy of mention that in spite of long operations often lasting two to three hours, done upon old and often debilitated patients, there were no deaths

NEONATAL MORTALITY*

A REVIEW OF FOUR HUNDRED AND TWENTY-EIGHT DEATHS

CORNELIUS T. O'CONNOR, M.D., BOSTON, MASS.

DURING the past several years many contributions have appeared based on the maternal mortality of various hospitals and cities, and the profession has been much exercised about the possibilities of a reduction of this mortality. Much less attention has been paid to fetal deaths and their causes, notwithstanding the fact that the birth rate of this country and other countries is approaching the death rate.^{1, 2} With babies at a premium, it is the duty of the obstetrician to determine, whenever possible, the cause of the fetal death, and to reduce as far as is humanly possible neonatal mortality.

There are two ways in which the obstetrician can combat the falling birth rate. The first is to reduce the pain of labor so far as is consistent with the safety of the mother and child, and the second is to lessen the incidence of fetal mortality. An increase in the number of surviving children will help to offset, to some extent, a falling birth rate.

In this analysis of the stillborn and neonatal deaths taken from one hospital, there will be no attempt to compare the mortality of this hospital with that of others, or with that of the community in general. Various factors tend to make such comparisons of dubious value. The rate would vary in different hospitals depending upon the number of syphilitic patients handled, the proportion of colored to white, the type of prenatal care, and the number of emergency cases transferred to the hospital. Indeed it is well to keep in mind that, "Statistical inquiries perhaps are frequently viewed with more respect than may actually be warranted. When applied to medical subjects, statistics have the same significance as the x-ray: they are a means to an end, not an end in themselves. Thus the now numerous statistical studies dealing with maternal mortality must be analyzed as a laboratory test would be rather than serving merely as a basis for recriminations. The lesson of essential importance is not that the maternal mortality rate is higher in one country or district than another but that some of them may be favorably affected by the knowledge gained from statistical analysis."² It is hoped that this analysis will, in a small degree, be a means to an end, the end being a reduction of neonatal mortality, and the means here, a possible increase in our knowledge of the factors causing infant mortality.

*Thesis presented for admission to Fellowship in the American Association of Obstetricians, Gynecologists and Abdominal Surgeons at the Forty-Eighth Annual Meeting, Skytop, Pa., September 16 to 18, 1935.

was removed by cautery excision two weeks ago. The patient is now in good condition, seventy-two years of age, six years after her primary operation and has a good chance of spending her remaining years without further recurrence.

In connection with this tendency to the development of new cancers in remaining islands of leucoplakic skin that have not been fully excised, we should give weight to the strikingly large number of patients in this group of forty-three patients, who developed cancers in other organs, either previous to or after the development of the vulval cancer. There



Fig. 2.—Carcinoma of the vulva developing on a basis of leucoplakic vulvitis with perianal involvement similar to Fig. 1. This carcinoma involved both labia minora and prepuce. This operation was done Oct. 7, 1929 followed by a double-sided Bassett. A small local recurrence was excised in 1931 near the urethra. Patient remained well until 1935 (see Fig. 3).

were four such cases, two patients who had cancer of the cervix and two who had cancer of the breast. Since this is considerably higher than the average incidence for such a combination of these two cancers, it makes us wonder whether we should not pay more attention to underlying somatic factors in cancer etiology.

It was certainly a striking fact in my series of cases that when a portion of leucoplakic skin was for some reason not completely removed in operations for simple leucoplakic vulvitis, cancer never developed in

1. The following three types of cases have been grouped together, viz., toxemia of pregnancy, chronic nephritis, and separated placenta. This is done only because it is impossible, from the data at one's disposal, to determine in many cases whether a case was one of toxemia of pregnancy or nephritis; and it was also impossible to determine because of lack of data, just how many of the cases of separated placenta were toxic. Inasmuch as we know now that most cases of the latter show definite signs of toxemia, it has been thought best to place these under one classification and subgroup them. There are altogether 86 cases in this classification (20.1 per cent of the total). (a) Of these, chronic nephritis was responsible for 40. All except 3 of these were stillborn children, and these 3 were premature. Nearly all started in labor spontaneously. (b) Toxemia of pregnancy accounted for 30 cases. Of these, 5 had convulsions. Eight may have been nephritic. Nearly all these patients started in spontaneous labor. (c) There were 16 cases of separated placenta. In 14 cases the child was stillborn. In one of these cases the patient was definitely a chronic nephritic. One child lived one day, another died in three days. One of the babies in this large group was autopsied.

2. *Cerebral Hemorrhage*.—There were 54 cases that were definitely cerebral hemorrhage and 12 where cerebral hemorrhage was the probable cause, which gives a frequency of occurrence of 15.4 per cent. The following facts emerge from a study of these cases. Only 7 of these were normal deliveries, and it is interesting to note in these that of the 7, 3 were premature deliveries and 2 were twins, both of which are factors that increase the chances of cerebral hemorrhage. There were only 5 cases of low forceps deliveries, 2 being performed on premature babies. Mid-forceps operations were performed 6 times, and high forceps in 19 instances. Version and extraction were done 17 times. It should be noted that in only 6 of these versions was the operation elective; in the other 11 cases forceps were tried and failed. Moreover of the 6 cases of version and extraction, when the operation was elective, 1 was a case of prematurity and hydramnios, another a toxemia of pregnancy where the child which died was one of twins. There were 8 cases of breech extraction, 1 being premature and 1 a twin pregnancy. Cesarean section was performed 2 times, but in both following futile attempts at delivery with forceps. In 2 cases the type of delivery is not noted. Frequently the diagnosis placed in the record was that of asphyxia or congenital heart disease but the type of delivery, difficulties encountered, and where the child lived, its subsequent course, made the diagnosis of cerebral hemorrhage unquestionable. Many of these children were stillborn, dying during the process of delivery. Toxemia was a factor only three times and prematurity six times. The majority of these patients were primiparas, and the cause of the difficulty was disproportion. Some of these patients were referred from the outside after futile attempts at delivery, but the majority were handled from the beginning of their labor in the hospital, either privately, or in the clinic. X-rays were taken infrequently, and then usually on the service cases, but not the private patients. Consultation, when held, was usually held after the patient had been in labor a long time and generally when attempts at delivery had failed. Autopsies were performed in only two instances. Of the two autopsies that were performed, the first case was a normal delivery, the child living two and a half hours and the diagnosis being congenital heart disease. Autopsy however revealed a hemorrhage at the base of the cerebellum and atelectasis. The second case that was autopsied was a personal case. The labor was premature by a month, low forceps delivery was performed and greater traction was needed to deliver the baby than expected. The baby had a pallid asphyxia and died in several hours, autopsy revealing hemorrhage at the base of the brain.

3. *Monstrosities*.—These occurred in forty-two cases, about 9.8 per cent of the total. Syphilis was not a factor in any of these. There was no history of previous abnormalities, and where subsequent deliveries took place there was no repetition

4. With an operability ratio of 75 per cent and a primary mortality of only 4.6 per cent, the treatment of cancer of the vulva gives with the possible exception of cancer of the uterine body the most favorable prognosis of any form of malignancy in the genital tract.

5. The experience of the past six years has further buttressed the conclusions presented in my paper of 1929, that radiation, vulvectomy, and superficial gland operations with vulvectomy have no place in our treatment of vulval cancer except as palliative measures. Three out of four such cases can and should be subjected to the double-sided Basset gland excision with vulvectomy, and approximately two-thirds of these will remain well for longer than five years.

3720 WASHINGTON BOULEVARD.

DISCUSSION

DR. FRED H. FALLS, CHICAGO, ILL.—For the leucoplakic type of vulvitis we are all agreed that surgery should be done. On the other hand, there is no unanimity of opinion about the use of operative procedures in the carcinoma cases. Our experience however coincides exactly with that of Dr. Taussig. Women of from sixty to seventy-five years of age seem poor operative risks, but our experience has been that they stand operation very well. In patients who were not good operative risks we have done the two-stage operation.

We do not believe that radium should be used as a curative agent in these cases, but it is helpful to radiate with the radium plaque the skin of the inguinal canal before operation. Our plan is to use small doses of radium by the radium plaque method, moving the plaque along the inguinal canal, about 200 mg. hours to each side, about three weeks before we plan to do the Basset operation. We also follow up our operative procedures with x-ray therapy in all cases, paying particular attention to the radiation of the inguinal and iliac glands and the areas where metastases may occur.

We have had no serious discomfort from any of these vulvectomies, although sometimes the patients have complained of some tenseness. We have had one death in a case of carcinoma, but there have been no deaths in the primary operation for leucoplakia. There has been no recurrence in the cases we have been able to follow at the Research Hospital. It is very difficult to follow up cases that come into the Cook County Hospital, but none of the patients operated upon there have come back with recurrence.

DR. W. A. COVENTRY, DULUTH, MINN.—We have not done the radical operation but I intend to in the future. Removal of the inguinal glands only is a limited operation and the majority of the cases so treated will get metastases along the iliac vessels and die. Two of my patients died rather spectacularly. In one metastases developed along the iliac vessels and the patient died of hemorrhage, death occurring in a very few moments. In the other where we had dissected out Bartholin's gland and inserted radium into the cavity, the incision never healed and the patient eventually died of hemorrhage from the iliac vessels.

DR. TAUSSIG (closing).—These old women if possible should be given the benefit of a vulvectomy at least. Death from spreading cancer of the vulva is one of the most painful and terrible conditions that we have to face in cancer hospitals. Even where we do not dare to go after the glands in the inguinal region or where age or the condition of the patient makes it inadvisable, a vulvectomy should be done.

6. *Infection*.—There were twenty-six cases (approximately 6 per cent). All of these of course died after delivery. The average length of life was seven days. Two facts stand out. There were sporadic cases of children dying of pneumonia, infected throats, etc., but the majority of these deaths occurred either in 1928 or 1930, at which times there were epidemics of infection in the nursery. Brouchopneumonia, or diarrhea, with high temperatures were the clinical findings in these infants with the exception of two which had infection of the throat and middle ears.

7. *Placenta Previa*.—This accounted for fifteen cases (3.5 per cent). Nearly all of these naturally were premature. One was autopsied. This was a personal case. The baby lived several hours, showing pallid asphyxia. Autopsy revealed a tremendous amount of cerebral edema.

8. *Hemorrhagic Disease*.—There were only nine cases. In one of these there was clinical evidence of cerebral hemorrhage but there was also generalized bleeding. This group then accounted for 2.1 per cent of the deaths. The routine injection of whole blood subcutaneously in the newborn is not done in this hospital. Of these nine cases two were breech, two were forceps and five were normal deliveries. In one of these nine the diagnosis of hemorrhagic disease is questionable, the clotting time being seven minutes and bleeding time four minutes, with a difficult midforceps delivery, the baby weighing six pounds, five ounces. Of these nine cases one patient had a toxemia of pregnancy and the baby that died was one of twins. Another patient had nephritis and labor was induced with a bag.

9. *Rupture of the Uterus*.—There were four cases (0.9 per cent). One was a postmortem cesarean section. A previous cesarean had been done. Another rupture occurred after prolonged labor, before the patient was sent to the hospital. In a third there was a transverse presentation which caused a rupture during labor, and the last was that of a bicornuate uterus which ruptured before labor. Three of the mothers died.

10. *Congenital Heart Disease*.—There were four cases (0.9 per cent). This diagnosis was often made when the facts did not seem to warrant it. Of these four cases, one was premature, in another the mother already had one child which had congenital dislocation of the hip and club feet, and one mother had a positive Wassermann.

11. *Thymus*.—This gland was responsible, possibly, for three deaths. One was stillborn. Autopsy revealed a thymus weighing twenty grams. Another child died in four days, beginning to have attacks of cyanosis on the third day. Autopsy was negative except for moderate enlargement of the thymus. The third child had attacks of dyspnea and cyanosis from shortly after delivery. The pediatrician diagnosed the case as one of enlarged thymus gland. There was no autopsy.

12. *Atelectasis*.—There were of course many cases where the lungs showed at autopsy atelectasis, or where the clinical diagnosis of atelectasis would be justified but they were placed in other groups because, from the standpoint of etiology, the diagnosis of atelectasis was insufficient or misleading. There were two cases (0.4 per cent). One however was a breech delivery in which there was pallid asphyxia and the question of cerebral hemorrhage of course cannot be ruled out. The other was a large baby delivered without difficulty by low forceps, but the lungs never expanded properly, and cyanosis was present until death.

13. There were several cases not capable of being grouped in the previous classification. There was one case of syphilis, another of intestinal obstruction, one where the mother had severe pernicious anemia and delivered a stillborn, and the last where a child deeply jaundiced at birth revealed at autopsy enlargement of the spleen and liver and a blood slide characteristic of myelogenous leucemia.

14. When the cases had been grouped, there still remained 75 (17.5 per cent) where the cause of death was obscure. Nearly all these were stillborn, 54 being in

McCauliff is inclined to believe that the deeper layers give way during the first seventy-two hours because the peritoneum would otherwise heal, and remain closed to cover the bowels. The main cause for disruption, when the incision is made *through* the muscle, according to this observer, is the weakening of the muscle, whereas the higher frequency of disruptions following median incision* depends upon the fact that the fascial incision entirely lacks muscle protection.

The more recent studies of Halsted, Harvey, and Howes and collaborators, on the healing of wounds in relation to the use of catgut and silk, as well as experiments of Kraissel and Meleney to determine the time of catgut digestion, seem to support the observations of Ries. These investigators have encouraged the use of non-absorbable sutures for the fascia in order to minimize the danger of wound separation by shortening the critical "latent period," before the scar has become firm.

According to Sokolov, who, in 1931, reported 725 cases of wound separation, it seems that the use of catgut actually increases this danger. Among 50 cases of wound separation reported by Meleney, silk had been used for the closure of the fascia in only one case. The same situation holds true for the 25 cases reported by Eliason and McLaughlin. Many surgeons in Germany and Austria therefore adhere to the use of silk. I saw only three or four such accidents among several thousand laparotomies during twenty years as a staff member of the II. Frauenklinik in Vienna. Appalled by the incomparably higher frequency of this complication when catgut is employed, I have returned to the use of silk for the closure of the fascia.

Though suture material apparently has some bearing on the incidence of wound separation, it seems very doubtful whether one is justified in giving it too much consideration. Many thousands of laparotomies closed with catgut have healed properly, and, on the other hand, laparotomies closed with silk have given way. Even if we should agree with Ries that in these cases the silk sutures have cut through the tissue, and assume that when catgut was used the sutures had been digested before the incision in the fascia was firmly united, there is no adequate explanation for the fact that the separation did not remain limited to the fascia. The occasional development of large incisional hernias soon after operation shows that disruption does not necessarily follow the separation of the fascia, if in the interval the scars in the subcutaneous tissue and skin have become strong enough to withstand the intraabdominal pressure.

Although there is no doubt that the separation of peritoneum and fascia is the first step, avoidable in many instances by the use of a non-absorbable material with tensile strength unreduced over a period of many days, it seems obvious that the disruption of the subcutaneous tissue and skin is due to an impairment of proper healing. In fact, one is impressed by the conspicuous absence of any healing reaction, the subcutaneous tissue of the ruptured wound presenting the aspect of a fresh incision although the operation has been performed a week or ten days previously (Cases 1, 2, 3, 4, 7, 9).

*Among 181 cases of disruption, collected from the literature, in which the location of the incision was designated, 151, i.e., 80 per cent, occurred following median laparotomy between symphysis and umbilicus.

and the expression of the child by abdominal pressure without the use of instruments should help to reduce the incidence of cerebral injuries in these delicate infants.

5. *Bleeding Cases.*—Whenever it is felt that the blood supply of the child has been interfered with, either by internal hemorrhage as in previa cases, or by interference with the circulation by abnormalities in the cord, the possibility of a marked cerebral edema as the cause of the asphyxia should be kept in mind, and if a spinal tap shows fluid under increased pressure, some infants may be saved. The only sign present in these infants may be pallid asphyxia. There may or may not be bulging of the fontanel, and convulsions and cyanosis are not necessarily present.

6. *Large Babies.*—The loss of five infants in this series simply because the babies were very large and the house officers were not competent to deal with the situation should lead to the institution of a rule that every large baby should be reported to the visiting obstetrician so that these unnecessary deaths may be avoided.

7. The presence of such a large unclassified group points to the necessity of very careful clinical records, and also the necessity for postmortem examination in all neonatal deaths including the stillborn. Apart from the possibility of an increase in our knowledge as to the cause of death in these cases, it is easier to obtain autopsies on infants than adults, and the obstetrician can be of service to the pathologist of the hospital in raising the percentage of autopsies.

8. The existence of thymic death in the newborn is not definitely proved from this study. This is in agreement with the findings of Hudson.⁵

The writer wishes to express his appreciation to the Reverend Thomas J. Brennan, superintendent of the hospital, Charles Kiekham, M.D., chief of obstetrics, and to Sister Elizabeth Marie, librarian, for their assistance and cooperation, and to the members of the staff for permission to include their private cases.

REFERENCES

- (1) *Holmes, Samuel J.*: The Trend of the Race, New York, 1921, Harcourt, Brace and Company. (2) *Brownlee, John*: Lancet 2: 925, 1924. (3) *Editorial*: J. A. M. A. 104: No. 11, 1935. (4) *Heffernan, R. J.*: New Eng. J. Med., August 18, 1932. (5) *Hudson, Henry W., Jr.*: New Eng. J. Med. 212: 910, 1935.

476 COMMONWEALTH AVENUE

SURGICAL COMPLICATIONS IN PREGNANCY*

FRED O. PRIEST, M.D., CHICAGO, ILL.

(From the Obstetrical Service of the Presbyterian Hospital and the Outpatient Department of Rush Medical College of the University of Chicago)

IN SURGICAL complications during pregnancy the conservation of both maternal and fetal life must influence us in our decisions. Where life or health of the mother is at stake, we believe that the maternal welfare takes precedence over that of the fetus. Usually elective operations should be deferred until after delivery. Pregnant women are subject to most of the surgical complications that may call for intervention.

Mussey and Crane pointed out that 2 per cent of the women presenting themselves for surgical lesions at the Mayo Clinic over a period of several years were pregnant. Baer, Reis and Arens stated that of 1,700 appendectomies on adult women, 1.7 per cent of them were pregnant. Paddock reported that 2.5 per cent of the series that he reviewed were pregnant.

*Read at a meeting of the Chicago Gynecological Society, November 15, 1935.

patients in whom this point was specially considered. In addition there was one patient with glycosuria among the first five, which makes five out of nine cases of wound separation showing the same condition. The regularity of this coincidence makes it probable that diabetes and similar disturbances of the sugar metabolism may interfere with the proper healing of abdominal incisions, and must be considered important causes of wound separation following laparotomy.

Although no further wound separation occurred, there were two cases of secondary infection with unusually widespread abscess formation. As the postoperative course was otherwise uneventful, it was felt that a particularly low tissue resistance must be considered.

In both patients (Cases 10, 11), the inability of the tissue to resist disintegration by a comparatively mild infection was associated with disturbances of carbohydrate metabolism. These two cases seem to explain the common experience that wound infection is more frequent in obese patients. Diabetes and obesity are closely related conditions, and there is some reason to believe that in many cases it is not the obesity itself, but an unrecognized diabetes which must be blamed for the complication.

These two cases with comparatively low resistance to infection may be considered as links connecting the complete wound separation in patients with unrecognized or inefficiently treated diabetes, and their uneventful course, if the disturbance has been controlled by sound management. This contention is supported by the histories of two diabetic patients treated adequately by the Medical Department and transferred for operation (Cases 12, 13).

In both cases the postoperative course was uneventful, and the patients were discharged on the eleventh day following abdominal total hysterectomy. The operations were followed by rises in blood sugar from 126 to 186 mg. and from 155 to 196 mg. per cent respectively, in spite of insulin. This corroborates the observation that physical injury in itself may cause a rise in blood sugar. It is likely that the wound separation in Case 7 (the patient with the severe diabetes) could have been avoided if the operation had been delayed for several weeks and not performed the first day after the blood sugar had dropped from 297 to 175 mg. per cent. Although no ether was used and no glucose was administered following operation, the sudden rise in blood sugar to 241 mg. per cent with its possible detrimental influence on wound healing should have been anticipated.

PROGNOSIS AND DIAGNOSIS

As Table I shows, the mortality following wound separation is appalling though the percentage varies between 12.5 and 72.7 per cent, and certainly depends greatly upon the experience and skill of the surgeon. The poor prognosis is due to the fact that the rupture almost

interest to note that the morbidity and days of postoperative hospitalization are noticeably increased by this procedure as compared to the results of Porro cesarean section for a similar condition.

TABLE I. OPERATIONS IN 9,767 CONSECUTIVE OBSTETRIC PATIENTS

	NUMBER	MISCAR- RIAGES	MATER- NAL DEATH	LIVING CHILD	REMARKS
Fibromyoma					
Early myomeetomy	5	1	0	3	1 not yet delivered
Cesarean + myomec- tomy	5	0	0	5	
Porro cesarean	13	0	0	13	
In puerperium	2	0	0	2	
Urinary tract	9	0	0	9	
Ovary	9	1	0	8	
Appendix	6	0	0	6	
Thyroid	4	1	0	3	
Breast	4	0	0	3	1 not yet delivered
Hemorrhoids					
In pregnancy	3	0	0	3	
In puerperium	4	0	0	4	
Bartholinian gland	3	0	0	2	1 not yet delivered
Bowel	2	0	1	2	
Hernia	2	1	0	1	
Incarcerated uterus	1	0	0	1	
Total	72	4 or 5.5%	1 or 1.39%	65	3 not yet delivered

TABLE II. FIBROMYOMA UTERI

AGE	PAR- ITY	GESTA- TION	TREATMENT	MATER- NAL MORTAL- ITY	DAYS IN HOSPITAL	MISCAR- RIAGES	LIVING CHILD
30	0	10 weeks	Myomeetomy	0	20	0	+
36	0	12 weeks	Myomeetomy	0	33	After 2 weeks	0
38	i	14 weeks	Myomeetomy	0	14	0	+
25	0	18 weeks	Myomeetomy	0	15	0	+
30	0	16 weeks	Myomeetomy	0	14	0	Now 6½ months
35	0	Term	Myomeetomy + ce- sarean	0	20	0	+
36	0	Term	Myomeetomy + ce- sarean	0	13	0	+
28	0	37 weeks	Myomeetomy + ce- sarean	0	26	0	+
38	0	Term	Myomeetomy + ce- sarean	0	25	0	+
42	0	Term	Myomeetomy + ce- sarean	0	20	0	+
13 patients		At or near term	Porro cesarean sec- tion	0	Average 15 days		Living child in each case
Para iii		12th post partum day	Vaginal hysterec- tomy	0	Left on 24th postpartum day		
Para ii		14th post partum day	Posterior colpotomy	0	Left on 22nd postpartum day		

hand, anticipation of the evisceration, even by "late" signs, is likely to improve the prognosis, since it allows proper preparation of the patient for the secondary closure.

TREATMENT

Most authors agree that proper treatment consists in secondary closure as soon as eventration has occurred. Eliason and McLaughlin, however, favor tamponage as the less injurious procedure though they have lost four out of five cases in which this method was used. Madelung, Starr and Nason agree that the immediate closure is the proper procedure in noninfected cases, but in the presence of infection recommend tamponage following reposition of the prolapsed intestines. This differentiation is scarcely justified since all cases of evisceration are more or less infected, and experience has taught that the peritoneum is more likely to overcome an infection if the peritoneal cavity is closed.

The final result will always depend upon the general condition of the patient, and the time which has elapsed between evisceration and secondary closure. Therefore, *the essential point is the earliest possible recognition.*

In operations for closure, spinal anesthesia is desirable because of the complete relaxation which facilitates reposition of the intestines. The surrounding skin is wiped with alcohol and ether and painted with merthiolate solution which is less irritating and therefore preferable to tincture of iodine. Omentum and bowel must be carefully mobilized by blunt separation from the edges of the laparotomy wound. No attempt should be made to separate the adhesions which may be found between the loops of bowel or between bowel and omentum. If possible, it is better to close the abdomen in layers, but through-and-through sutures of nonabsorbable material such as silver wire or silkworm-gut should be inserted as additional security. Speed seems to be important and no time should be wasted in an attempt to make an anatomical repair. The healing of the wound following secondary closure is, as a rule, very satisfactory, and our final results have been surprisingly good.

CASE HISTORIES

CASE 1.—S. B., aged sixty years, Hospital No. F 9282. Fibroid of uterus; obesity. Nov. 5, 1931, abdominal total hysterectomy under gas-ether. Uneventful course. Disruption of laparotomy wound on eighth postoperative day. Wound without evidence of infection or healing reaction. Immediate closure. Recovery.

CASE 2.—G. A., aged fifty-three years, Hospital No. E 6532. Cancer of body of uterus; obesity. Aug. 4, 1932, abdominal total hysterectomy under gas-ether. Large amount of glucose intravenously. Uneventful course. Disruption seventh postoperative day following coughing. Conspicuous absence of healing reaction. Immediate closure. Recovery.

CASE 3.—O. S., aged thirty-six years, Hospital No. G 9188. Fibroid of uterus; obesity. Sept. 24, 1932, abdominal total hysterectomy under gas-ether. General

pregnancy. The other, operated upon at sixteen weeks, went to term. The remaining patients were operated upon between the thirty-seventh week and full term, with the exception of one from whom the cyst was removed on the sixth postpartum day. Living viable children were delivered in all these latter cases.

In a tabulation of the appendicitis cases (Table V), two patients had acute suppurative appendices that had not ruptured. All were closed without drainage.

TABLE V. APPENDICITIS

AGE	PARITY	WEEKS OF GESTATION	FATE OF FETUS	LIVING CHILD	MATERNAL MORTALITY
28	i	7	Delivery at term	+	0
23	0	12	Delivery at term	+	0
24	0	18	Delivery at term	+	0
23	i	20	Delivery at term	+	0
34	0	24	Delivery at term	+	0
31	ii	38	Delivery 40 hours postoperative	+	0

The incidence of appendectomy in this series is low as compared with the report of Baer, Reis and Arens, Mussey, and others. In spite of this apparent paucity of material, it is noteworthy that in none of these patients was operation delayed so long that ill results occurred either to the mother or to the fetus. Furthermore, our postmortem records do not reveal any deaths from ruptured appendix in pregnancy or in the puerperium.

Most of our patients with thyroid disease (Table VI) have been treated conservatively either by medical procedures or by therapeutic doses of x-ray. Four out of thirty-six patients were operated upon.

TABLE VI. THYROID DISEASES

TYPE OF THYROID	BMR	AGE	PARITY	TIME OF OPERATION	FATE OF FETUS	MATERNAL MORTALITY	LIVING CHILD
Large colloid	+17	30	ii	6 weeks	Term delivery (twins)	0	++
Toxic adenoma	+66	38	i	8 weeks	Term delivery	0	+
Toxic adenoma	+43	29	0	12 weeks	Term delivery	0	+
Toxic adenoma	+72 to +58	34	0	32 weeks	Twins (death in utero)	0	00

NOTE: All except first patient had had Lugol's and bed rest preoperatively; all were treated by subtotal resection.

There was no maternal mortality either in those handled by medical or surgical methods. It is interesting to note that out of the total number of thyroid disease cases studied there were three sets of twins. Two of these sets occurred in the four patients operated upon. This brings up the question of fetal mass and body surface on the increased activity of the thyroid or the consequent glandular imbalance produced by multiple pregnancy.

of 138 mg. per cent, and antidiabetic regime was started. The infection cleared up readily and the patient was discharged with an almost healed wound on the sixteenth postoperative day.

CASE 11.—M. H., aged thirty-nine years, Hospital No. J 5702. Peritoneal adhesions; cystocele; cervicitis. May 28, 1934, abdominal total hysterectomy. Post-operative course: uneventful except for moderate fever for three days. The patient was allowed up on the eighth postoperative day. The following day a small draining sinus was found near the upper end of the incision through which great quantities of pus had been emptied. On the eleventh day probing gave evidence that the skin in the entire length of the incision was undermined and had to be opened to its full extent. At this time the silk sutures of the fascia were intact except for a few centimeters at the lower end. Secondary closure. The peritoneum was firmly healed and no evisceration had taken place. A sugar tolerance test which had been made the day the draining sinus was discovered gave the following results:

Hours	0.0	0.5	1.0	1.5	2.0	2.5
Bl. sugar	124	179	231	231	212	
Urine sugar	0		0		0	

Blood sugar the second day following closure was 186 mg. per cent. The patient was therefore considered as a diabetic with high renal threshold and was put under anti-diabetic management. Further course was uneventful.

CASE 12.—G. W., aged fifty-six years, Hospital No. H 4145. Diabetes; adenocarcinoma of body of uterus. Blood sugar prior to operation 126 mg. per cent. Abdominal total hysterectomy under spinal anesthesia without additional gas or ether. Blood sugar 165 and 186 mg. per cent on the days following operation. Uneventful postoperative course. Discharged on the eleventh day.

CASE 13.—B. C., aged thirty-eight years, Hospital No. H 6681. Diabetes; fibroid of uterus; chronic appendicitis. Blood sugar prior to operation 155 mg. per cent. Abdominal total hysterectomy under ethylene-ether. Blood sugar 196 and 170 mg. the days following operation. Uneventful postoperative course. Discharged on eleventh day.

SUMMARY

1. Nine cases of wound separation following laparotomy are reported.
2. All but one patient recovered following *immediate closure*.
3. Blood sugar determinations and sugar tolerance tests performed in four successive cases revealed a diabetic condition.
4. Disturbances of carbohydrate metabolism are believed to be an important cause of postoperative separation of abdominal incisions.
5. Considering the high coincidence of obesity and diabetes, stout patients should have blood sugar determinations before laparotomy.
6. Because of its unlimited tensile strength, nonabsorbable material is recommended for the closure of the fascia to safeguard the wound in cases of retarded healing.
7. Recognition before evisceration actually occurs is possible in many cases and improves the final results.

REFERENCES

- Baer, J. L., Reis, R. A., and DeCosta, E. J.: AM. J. OBST. & GYNEC. 28: 842, 1934. Colp, R.: Ann. Surg. 99: 14, 1934. Eliason, E. L., and McLaughlin, C.: Ann. Surg. 100: 1159, 1934. Freeman, L.: Causes of Postoperative Rupture of Ab-

CONCLUSIONS

1. The maternal mortality resulting from surgery in pregnancy is 1.39 per cent in this series. This corresponds with Mussey's report of 370 cases with a maternal mortality of 1.08 per cent (Table VIII).

TABLE VIII. MORTALITY

	GROSS FETAL MORTALITY	MATERNAL MORTALITY
Allen and Bauer		
Normal	1.87%	0.0085% (1 in 1200)
Medical complications	3.7 %	0.0356% (1 in 250)
Surgical complications	5.5 %	1.39% (1 in 72)
Mussey's series of surgical complications (350 cases)	4.5 %	1.08% (1 in 92)

2. The operative mortality in pregnancy is only slightly increased over that in the nonpregnant state.

3. Gross loss of fetal life in this series is 5.5 per cent. Mussey reported 4.5 per cent. Our gross fetal mortality in women with medical complications is only slightly lower or 3.7 per cent. These figures may be contrasted with the rate of 1.8 per cent in our normal series.

4. We agree in general with the conclusions previously arrived at in the literature that hesitation and procrastination in surgical decisions should have no more place in the pregnant than in the nonpregnant woman.

REFERENCES

- (1) *Curtis, Arthur H.*: Obstetrics and Gynecology, Philadelphia, 1934, W. B. Saunders Co. (2) *Davis, C. H.*: Gynecology and Obstetrics, Hagerstown, Md., 1934, W. F. Prior Co. (3) *Shallenberger, W. F.*: Am. J. Surg. 28: 582, 1935. (4) *Mussey, R. D., and Crane, J. F.*: Arch. Surg. 15: 729, 1927. (5) *Paddock, C. E.*: Am. J. Obst. 68: 401, 1913. (6) *Barrett, C. W.*: Surg. Gynec. Obst. 16: 28, 1913. (7) *Mussey, R. D., Plummer, W. A., and Boothby, W. M.*: J. A. M. A. 87: 1009, 1926. (8) *Varó, B. V.*: Zentralbl. f. Gynäk. 50: 291, 1926. (9) *Mayo, W. J.*: J. A. M. A. 56: 1021, 1911; 74: 1685, 1920. (10) *Füth*: Arch. f. Gynäk. 76: 507, 1905. (11) *Myer*: Am. J. Obst. 1: 1908. (12) *Webster*: Surg. Gynec. Obst., July, 1905. (13) *Findley*: Am. Med. J., 1912. (14) *Mundé, P. F.*: Med. Record N. Y., Dec. 1, 1894; Mar. 23, 1895; Oct. 26, 1895. (15) *Abrahams*: Am. J. Obst. 35: 1897. (16) *Baer, J. L., Reis, Ralph A., and Arens, Robert A.*: J. A. M. A. 98: 1359, 1932. (17) *Culpepper, J. P., Jr.*: New Orleans M. & S. J. 87: 370, 1934. (18) *Maes, Urban*: AM. J. OBST. & GYN. 27: 214, 1934. (19) *Frazier, C. H., and Ulrich, H. F.*: AM. J. OBST. & GYN. 24: 870, 1932. (20) *Kornfeld, G., and Daichman, I.*: AM. J. OBST. & GYN. 27: 768, 1934.

55 EAST WASHINGTON STREET

Talamo, Pasquale: A Rare Case of Myxolipoma of the Vulva, Arch. di ostet. e ginec. 42: 635, 1925.

A tumor the size of a filbert nut was noticed in the right labium majus at five years of age. Eight years later it had reached the size of a turkey egg. Excision was simple and microscopic examination showed the tumor to be a lipoma with areas of myxomatous tissue scattered through it, a myxolipoma.

WM. PIERCE.

It is my impression from studying the literature, that the routine use of stay or retention sutures, not removed before the tenth or twelfth postoperative day, and the use of properly adjusted adhesive straps and supporting abdominal binders would greatly reduce the incidence of postoperative disruption of abdominal wounds and hernias.

DR. FRED J. TAUSSIG, St. Louis, Mo.—One of the predisposing factors that I personally consider most important in our experience at the Barnard Free Skin and Cancer Hospital is anemia. In suturing the abdominal incision, I would particularly stress that after making a midline incision through the skin we do not also make a midline incision through the fascia.

I prefer to use No. 2 twenty-day catgut both for peritoneum and fascia and also employ a through-and-through fish-line tension suture which is not removed until approximately the tenth day. I would hesitate very much to use silk for the fascia because of experience in infected cases where such silk knots act as a foreign body and take months to come out through the wound. We should realize that the wound is weakest at about the eighth or ninth day, and at this time when we change our dressing we should not be content with a small strip of adhesive but use a wide strip for the next four days, so that the abdominal incision is thoroughly supported.

DR. JACOB L. DUBIS, CLEVELAND, O.—The type of incision that I have used for years with good satisfaction is the Pfannenstiel. One can take out a tumor up to the umbilicus with this incision. There is less wound infection and the use of the silkworm-gut is unnecessary. Overlapping the fascia gives added strength. Important points in the technic are the stopping of all bleeding and oozing, and the careful avoidance of traumatism.

DR. CARL HENRY DAVIS, MILWAUKEE, WIS.—Most of us will agree also that a large proportion of wound difficulties are not wound infections primarily, but they are cases where hemostasis was not perfect, serum collected, causing separation of the tissues with imperfect healing.

DR. FRED H. FALLS, CHICAGO, ILL.—Usually a day or two days before the actual evisceration there occurs a leakage of serum from the wound. Whether that occurs because of the failure of proper hemostasis in the wound edges or whether the serum comes from the peritoneal cavity and precedes the actual separation, I do not know. Whenever we see our dressings wet with serum we presume that evisceration is already present and take steps to prevent an actual extrusion of the bowel.

Second, evisceration is apt to occur in women with asthma where the wound is continually being put under tension due to the labored breathing. In two cases of this kind in my experience loops of bowel were left outside of the abdomen for several days until the dyspnea improved. Both patients recovered after the delayed return of the bowel to the peritoneum.

DR. JEAN PAUL PRATT, DETROIT, MICH.—Wound healing takes place by formation of capillary loops, that is, granulation tissue. General conditions which interfere with the proper blood supply, such as debilitating diseases, under-nutrition or starvation, affect the nutrition of the tissues involved in wound healing and cause delayed repair. Tension from stay sutures has seemed to us a local factor impairing circulation. In a comparative series of cases our results have been better without stay sutures. Heavy catgut affords more foreign body to be carried away and therefore interferes with wound healing, and it has been our practice to use catgut not heavier than No. 1 for wound closure.

first, that there are approximately twice as many premature births, stillbirths, and febrile puerperiums in the medical disease group as in the nonmedical; second, five times as many maternal deaths resulted per thousand deliveries in the medical disease class as in the nonmedical; third, the operative incidence is 3.1 per cent higher in the affected than in the normal group.

Table III is a more detailed study of the obstetric results occurring in the various medical disease divisions. It is apparent that more maternal deaths occurred when pregnancy was complicated by anemia, infected teeth, organic heart dis-

TABLE III

	TERM	PREMATURE	GROSS FETAL MORTALITY	AFEBRILE	FEBRILE	MATERNAL DEATHS	NORMAL DELIVERY	GROSS OPERATIVE DELIVERY
Anemia (below 70% hemoglobin, 3,000,000 R.B.C.)	1,139	153	36	1,136	154	3	1,000	292
Infected teeth	1,051	51	28	1,044	58	3	1,064	38
Toxemias	311	32	32	301	42	1	273	70
Organic heart disease	102	12	7	108	6	2	94	30
Syphilis	107	17	5	110	14	0	119	5
Varicose veins	208	9	3	202	15	0	212	5
Upper respiratory disease	46	0	0	39	7	0	44	2
Diseases of lungs and pleura	10	0	1	2	8	1	5	5
Skin	9	0	0	9	0	0	9	0
Thyroid disease	30	2	2	29	3	0	24	8
Diabetes mellitus	9	1	0	9	1	0	8	2
Allergic diseases	10	0	0	9	1	0	8	2
Infections of urinary tract	16	1	1	12	5	0	15	2
Gonorrhea	10	0	0	9	1	0	8	2
Diseases of body mechanism	5	0	0	5	0	1	5	0
Diseases of nervous system	8	2	0	9	1	0	6	4
Tuberculosis	6	1	1	5	2	0	4	3

ease than by any other medical complication. However, one maternal death occurred in the toxemias, disease of the lungs and pleura, body mechanism, incomplete abortions and therapeutic abortions. Fetal mortality is noticeably increased when the mother suffers from toxemia or organic heart disease. Anemic patients seem to require obstetric operative procedures more frequently in the conduct of their labor. We suggest that this may be due to inability to complete labor spontaneously because of lowered vitality. The toxemias and the anemias also seem to lower resistance against infection, since these two complications claim the greatest percentage of febrile puerperia. Premature births occurred more frequently in the anemias, toxemias, and syphilis (Table V).

TABLE IV

	WARD 51	WARD 50	WARD 41
	NORMAL OBSTETRIC	AFEBRILE, PATHOLOGIC OBSTETRIC AND MEDICAL OBSTETRIC CASES	SEPTIC AND VENEREAL OBSTETRIC CASES
Total births	8,897	2,557	2,089
Stillbirths	108	253	160
Infant deaths	79	195	144

The greatest cause of postnatal fetal death during 1933 at Cook County Hospital was prematurity indicated by the following figures: Total deaths 130, premature deaths 97, and full-term deaths 33.

to a distance of 15 to 25 mm. If the female bitterlings are segregated from the males this natural lengthening process does not occur. It was found that by stimulation with the estrogenic hormone it is possible, artificially, to reproduce the ovipositor lengthening during any season of the year and not, as Szusz thought, only during the breeding season. It was also found that the fish reacted in a satisfactory manner when the hormone was dissolved or suspended in the water they inhabit, making it unnecessary to inject the products into the fish as did Fleischmann and Kann, thus reducing the chances of injuring or killing the test animal. By applying these principles we use the same fish for repeated tests allowing a recovery period of two to three weeks for the elongated ovipositor to return to its normal state before a further test is attempted.

The fish are placed in a liter of fresh water containing 4 c.c. of the urine to be tested. Observations are made at twenty-four-hour intervals for a period of seventy-two hours. Should the ovipositor extend well beyond the margin of the ventral fin, the test is considered as being positive. In the event that the ovipositor reaches just to the fin margin or above this, the test is read as being negative. The actual length of the extension of the ovipositor beyond the fin margin is of no apparent significance. Ehrhardt and Kuhn rate their tests, and thus the materials tested as +, ++, and +++ according to the distance beyond the fin margin that the elongated ovipositor attains. Kotz, Douglas and Parker mention "moderately positive" tests. We have felt this to be an unreliable method of designation for either the potency of the product tested or the estrogenic hormone content of the urine. This is a logical conclusion for us to reach when, during the course of our standardizations, we have repeatedly obtained all stages of ovipositor lengthening as a result of stimulation on several fish by a single urine specimen. Suffice it to say that an ovipositor lengthening beyond the fin margin is a positive reaction.

At this time it seems advisable to strengthen our contention that the reaction here discussed is a product of stimulation by estrogenic substance. An exhaustive study of the gross and histologic anatomy of the bitterlings both in their normal state and when artificially stimulated has aided us somewhat in this deduction. The ovipositor has the histology of the human cervix uteri. Under stimulation there is a dilatation of the lumen, the blood vessels and the lymphatic spaces, with occasional pigmentation but no actual cellular changes. The ovary and oviduct are unaffected by the artificial stimulants. If we may be allowed to draw analogies between the fish and the mammals we see the same thing in the mouse, the rat, and the rabbit under estrogenic hormone stimulation, changes in the cervix and vagina with no noticeable effect upon the ovaries.

To enhance this view we destroyed the gonadotropic hormones in urine by boiling and the subsequent tests were all positive. To prove this point to our entire satisfaction we proceeded to test pure hormonal, commercial hormonal, and gland extract products. In order to carry out this work we appealed to Dr. E. A. Doisy who very graciously supplied us with

TABLE VI. ABORTIONS

	SPON- TANEOUS	INCOM- PLETE	THERA- PEUTIC	THERAPEUTIC AND VAGINAL STERILIZA- TION	MIS- CARRIAGES
	53	194	37	22	25
Dilatation, curettage	0	194			10
Maternal death	0	1	1	0	0
Tuberculosis			2	2	Spontaneous 24
Heart disease			11	4	Induced 1
Toxemia			8	5	Complete 15
Dementia precox			4	0	
Psychosis			0	8	
Diabetes			1	2	
Pernicious vomiting			3	0	
Hyperthyroid			3	0	
Pyelitis			2	0	
Encephalitis			1	0	
Epilepsy			1	0	
Leucemia, myeloid			1	0	
Syphilis			0	1	

CONCLUSIONS

1. From this study it seems that it is five times more dangerous for a woman affected by medical disease to bear children than it is for a healthy woman.

2. The child born to a woman suffering with a medical disease is twice as apt to be a stillborn as a child born to a normal woman.

3. The increased susceptibility to infection of these debilitated women is noteworthy. One-half of these women who died, died from sepsis.

4. It is evident that future statistical studies of maternal and fetal deaths should include a critical analysis of the patient's health as a great factor in the end obstetric results, rather than basing these conclusions entirely upon the outcome of operative obstetric procedures.

5. Attempts to reduce fetal and maternal mortality should be directed toward improving the health of the expectant mothers and eliminating, as far as possible, those patients physically unfit for childbearing. This combined with improved obstetric procedures should help us to approach the irreducible minimum of maternal and fetal death.

55 EAST WASHINGTON STREET

DISCUSSION

DR. FRED L. ADAIR.—In all we have had 41 deaths in something over 13,000 deliveries at the Chicago Lying-In. In 26 of these, associated with the pregnancy, death was due in 10 cases to infection, in 8 to hemorrhage, in 3 to hyperemesis, in 3 to embolism, in 1 to eclampsia, and in 1 to aspiration pneumonia. In this same series of 26 cases, 7 had other complications which contributed to the death; for instance, one of them had an antepartum infection which we attributed to middle ear infection. The immediate cause of death in this case, however, was postpartum

these being the delayed positive reactions obtained with the purer estrogenic substances as compared to the more rapid results evidenced on testing with the uncrystallized commercial products (progynon, amniotin,

TABLE II. REACTIONS USING VARIOUS GLAND EXTRACT PRODUCTS

SUBSTANCE	AMOUNT	REACTION				
		24 HR.	48 HR.	72 HR.	96 HR.	120 HR.
Parathyroid	$\frac{3}{8}$ gr.	Neg.	Neg.	Neg.	Neg.	Neg.
Adrenal	3 gr.	Neg.	Neg.	Neg.	Neg.	Neg.
Spleen	4 gr.	Neg.	Neg.	Neg.	Neg.	Neg.
Testis	4 gr.	Neg.	Neg.	Neg.	Neg.	Neg.
Placenta—desiccated	6 gr.	Neg.	Neg.	Neg.	Neg.	Neg.
Pancreas	6 gr.	Neg.	Neg.	Neg.	Neg.	Neg.
Mammary gland	5 gr.	Neg.	Neg.	Neg.	Neg.	Neg.
Thyroid	5 gr.	Neg.	Neg.	Neg.	Neg.	Neg.
Pineal	$\frac{1}{8}$ gr.	Neg.	Neg.	Neg.	Neg.	Neg.
Bone marrow	5 gr.	Neg.	Neg.	Neg.	Neg.	Neg.
Prostate	6 gr.	Neg.	Neg.	Neg.	Neg.	Neg.
Thymus	6 gr.	Neg.	Neg.	Neg.	Neg.	Neg.
Antuitrin-G	80 units	Neg.	Neg.	Neg.	Neg.	Neg.

emmenin). We also find that ether extracts of these products and of pregnancy urine remove the estrogenic principles, the ether extract giving positive results while the residues produce constant negatives. This phase of our work strengthens our conviction that an estrogenic principle produces the ovipositor lengthening reaction. Negative results were obtained at all times on the gland extract products as well as on all the gonadotropic hormone products tested. We believe that in the crystallization process, changes take place in the estrogenic products that decrease the efficiency of their action upon the ovipositor of the bitterling.

Ehrhardt and Kuhn claim the reaction to be one of a specific hormone for ovipositor lengthening (legeröhrenhormon) which is so closely related to the estrogenic hormone in action that the two may be isomers. They drew this conclusion when unsatisfactory results were obtained by use of urine from pregnant mares, a urine known to contain a tremendous amount of estrogenic substance. According to Doisy⁶ the estrogenic substance obtained from the mare's urine is not the same as that derived from the urine of human beings. This fact, together with the delayed reactions obtained from the pure hormones of Doisy, detracts considerably from the main evidence in favor of the theory of Ehrhardt and Kuhn.

In a more recent article Baumann and Szusz⁷ reach a conclusion similar to that of Ehrhardt and Kuhn, claiming the ovipositor lengthening function to be the action of a specific hormone which they designate as the "harnfraktion." These authors do not give their method of extraction of this fraction from the urine, but they claim the action of their specific hormone is partly that of prolactin and partly that of estrin while being specifically neither of these. They obtained thecalization in the ovaries of adult rats with the production of atretic corpora lutea and an excess production of theca lutein cells without the formation of follicles, while they demonstrate no typical reaction on the ovaries of infantile rats. We are not familiar, either from personal experience or from a study of the literature, with any single hormone that has a gonadotropic and estrogenic function such as is claimed in this instance by Baumann and Szusz. Until we are made aware of the method of production of the "harnfraktion" we must assume that Baumann and Szusz were dealing with a product contaminated by prolactin which in our work has not had the least effect upon the ovipositor of the bitterling.

particular, I believe, to the cleaning up of mouths. Dr. Curtis at his clinic said that his chief surgical complication was thrombophlebitis. I do not know whether Dr. Curtis is a believer in foci of infection or not. I reported in May on 627 cases of vaginal hysterectomy for benign disease with three deaths; in these cases there was one thrombophlebitis. Since that time an additional number of patients have been operated upon so there are now 709 vaginal hysterectomies in this series still with only one case of thrombophlebitis. Except in patients coming from a distance where delay was difficult, none of these patients was operated upon until infected tonsils were removed and abscessed teeth pulled. I think that is the chief factor in the low mortality and low morbidity, and the same applies to obstetrics.

I was astounded at the number of myomectomies performed during pregnancy. It must be a rather unusual condition that would lead a surgeon to open an abdomen during pregnancy to take out myomas and leave the pregnancy intact. We know that even without pregnancy a myomectomy carries considerable morbidity and a higher mortality than does hysterectomy, so that in general, patients with fibroids should be carried along even with considerable discomfort rather than undergo operation during pregnancy.

DR. ALLEN (closing).—I think a factor behind both of these reports was self-protection. So many reports have come out in the literature as to the guilt of the obstetrician for the rising death rate in obstetrics. It may be that we have drawn faulty conclusions but it would be advisable for a similar analysis to be made of a larger group of obstetric patients so that we could divide the responsibility.

I was quite impressed in Omaha a short time ago by a report by Dr. Dannreuther of a series of 2,000 gynecologic cases; in the last 1,000 cases there was a marked difference in the final mortality that was obtained, not by perfecting surgical technic, but by paying more attention to medical complications that might affect the final result. It seems to me that instead of the obstetrician and pediatrician taking all the responsibility for this high maternal and fetal death rate, we should analyze cases with something else in mind than that the obstetrician did a high forceps and the woman died.

When Dr. Daly asked whether these were medical or obstetric deaths, a great many of them are counted against the obstetrician, but they were operated upon, that is, they had a surgical delivery, because they did not have the strength to go on. It seems to me we have been placed in a situation that should be cleared up by allocating as clearly as we can the responsibility of the patient and the various branches of medicine.

DR. PRIEST (closing).—In answer to Dr. Reis, I am not defending all the treatment carried out. The record I found on the patient with carcinoma of the rectum showed that radical resection was done and the pregnancy was not diagnosed at that time. She was not seen by an obstetrician until the fetus was nearly viable, when she came back to the clinic with swelling; the surgeon thought it might be a metastasis. Because the fetus was near viability, she was allowed to go on to term.

Myomectomy at term where cesarean section was done was included because all told most of these patients might not have had to have a cesarean at the time of delivery except for the existing complication of fibroids.

In answer to Dr. Heaney, I intended to say that two myomectomies done early in pregnancy were done with a mistaken diagnosis. An ovarian cyst was diagnosed preoperatively in one case and an ectopic pregnancy in the other. I talked to the doctor who operated upon this last patient; he did a myomectomy and had no defense for his choice of treatment done at that time.

5. Placental polyp. Continuous bleeding for five months following spontaneous delivery at term. Curettage revealed a polyp which was made up of placental tissue with chorionic villi. Test upon fish positive. Friedman test negative.

6. Ectopic pregnancy. Proved at operation. Test upon fish positive. Friedman test negative.

TABLE III. TEST UPON THE BITTERLING IN PREGNANCY. ONE HUNDRED THIRTY-TWO CONSECUTIVE TESTS CHECKED AGAINST THE FRIEDMAN TEST

Positive to both tests	51
Negative to both tests	62
Positive fish—negative Friedman test	15
Negative fish—positive Friedman test	4
Total tests	132
Disagreements	19
Per cent disagreements	14.4%

ERRORS

	FISH IN ERROR	FRIEDMAN IN ERROR
Early pregnancy	2	2
Ectopic pregnancy	0	5
Endocrine disorder	0	1
Salpingitis	2	0
Pregnancy toxemia	0	1
Incomplete abortion	1	2
Menopause	1	0
Missed abortion	0	1
Placental polyp	0	1
Errors	6	13
Per cent errors	4.5%	9.8%

7. Incomplete abortion, eight weeks' duration. Proved at operation and on microscopic section. Test upon fish positive. Friedman test negative.

8. Subacute salpingitis. Suspect ectopic pregnancy. Proved by posterior colpotomy. Test upon fish positive. Friedman test negative.

9. Ectopic pregnancy. Proved at operation. Test upon fish positive. Friedman test negative.

10. Early pregnancy, intrauterine; five days after first missed period. Test upon fish negative. Friedman test positive. Subsequent fish test positive.

11. Early pregnancy; seven days after first missed period. Test upon fish negative. Friedman test positive. Test upon fish one week later positive.

12. Menopause. Patient amenorrheic for two months. Menstruated shortly after tests were run. Test upon fish positive. Friedman test negative.

13. Ectopic pregnancy. Proved at operation. Test upon fish positive. Friedman test negative.

14. Periods of amenorrhea alternating with menometrorrhagia. Curettage revealed pseudopregnancy reaction of endocrine dysfunction. Test upon fish negative. Friedman test positive.

15. Early pregnancy; four days after first missed period. Test upon fish positive. Friedman test negative. Friedman test five days later positive.

16. Subacute salpingitis. Proved at operation. Test upon fish positive. Friedman test negative.

17. Ectopic pregnancy. Proved at operation. Test upon fish positive. Friedman test negative.

involuntarily. Examination of the left arm showed pulsation in the left axillary artery but this ceased about 1 to 1½ inches below the beginning of the brachial artery. There was no capillary reaction below the elbow, and the left forearm and hand were paler and cooler than the right.

There was evident obstruction of the brachial artery and cerebral embolus producing the hemiplegia.

Consultation with the surgeons as to the advisability of attempting to remove the embolus in the brachial artery was held, but in view of serious cerebral damage present, conservative measures were thought best. Her condition became progressively worse, and she died on the seventeenth day postoperative.

The report of the autopsy is as follows:

1. Embolus to left middle cerebral artery with left encephalomalacia.
2. (a) Bilateral pulmonary infarcts (small) and pulmonary thrombi; (b) right recent small pulmonary emboli; (c) atelectasis, partial, left lower lobe; (d) early lobular pneumonia, right middle lobe; and (e) ancient left apical pulmonary tuberculosis.
3. Diffuse, slight atheromatosis.
4. Bilateral internal iliac and common iliac venous thrombosis.
5. Left brachial artery embolus with early patchy gangrene of forearm and hand.
6. Chronic passive congestion of the liver, early.
7. Operative removal, recent, of appendix and left ovary. Recent suprapubic operative wound.

In ulnar-flexor aspect of the left forearm and left thenar eminence ovoid purplish red areas of incipient gangrene were present, some 8 and 4 cm. long by 3 and 2 cm. wide, respectively. Usual collar-longitudinal autopsy incision.

Pericardial cavity contained 8 to 10 c.c. of straw-colored fluid. Serosa were smooth and glistening. Heart was natural in size and shape, contracted in all chambers, and contained p.m. clot and fluid blood. Endocardium was smooth. Valves and orifices were natural except for slight atheromatosis of aortic cusps of mitral valve. Myocardium was dark red, firm, and showed no scars. Foramen ovale was closed. In the right pulmonary artery two definitely antemortem, grayish red, emboli, each some 4 cm. long by 7 mm. wide, were present.

Aorta showed moderate diffuse atheromatosis with slight ulceration near bifurcation.

The left brachial artery in its first third was found to be occluded by a grayish red apparently propagated thrombus, not attached where encountered. Presumably original embolus was farther down vessel near antecubital fossa, but artery was not opened this far.

Both internal iliac veins from region of broad ligaments were found to be thrombosed, thrombus extending into common iliac veins, where in each vessel a 3 to 4 cm. grayish red, partially adherent thrombus was present. External iliac veins apparently were free of thrombi.

Pleural cavities were free of fluid and adhesions. Lungs fairly voluminous. About two-thirds of the posterior portion of the left lower lobe was atelectatic. Three centimeters' zone of fibrous and partially calcific apical tuberculous of left lung. On section bilateral lower lobe purulent bronchitis was found; definite thick yellow pus was exuding from cut surface of bronchioles. In the right middle and upper portion of the left lower lobes red wedge-shaped infarcts of apparently the same age were present, each some 3 cm. in its widest diameter. There were a few patches of lobular pneumonia. A few thrombi were present in what were apparently pulmonary veins in infarcted zone, but careful dissection could not absolutely identify a large thrombus originating in one.

Peritoneal cavity was free of fluid. Cavity was smooth and glistening.

nant women at various and varying times during the menstrual cycle. Because this is at variance with the work of Frank¹² on the levels of the female sex hormone in the blood and urine during the course of a menstrual cycle we are, at the present time, at a loss to explain such results. Were these forty women examined physically and were their histories closely inquired into, we might be able to reach some conclusions.

Two women who have regularly recurring menstruation and who lack any pelvic abnormalities were followed throughout two consecutive menstrual cycles by testing urines at three-day intervals. In both negative tests were obtained at all times except at mid-menstruum, the time of ovulation. Frank found this to be the time when the estrogenic hormone content of the urine and blood was at its cyclic maximum.

In an attempt to determine the possibility of transmission of the excesses in estrogenic hormone at term from the mother to the fetus, the urines of fifteen newborn infants were tested. In only one instance, a female child four days old, was a positive test obtained, all others giving negatives (Table V).

TABLE V. TESTS UPON URINES FROM NEWBORNS

AGE	SEX	REACTION
4 days	F	Pos.
7 days	F	Neg.
10 days	M	Neg.
6 days	F	Neg.
10 days	M	Neg.
6 days	M	Neg.
6 days	M	Neg.
5 days	M	Neg.
4 days	F	Neg.
3 days	F	Neg.
9 days	F	Neg.
14 days	F	Neg.
6 days	M	Neg.
7 days	F	Neg.
5 days	F	Neg.

Heckel¹³ has been pursuing the work upon the bitterling from the urologic standpoint and up to the present time he has a number of tests upon the male. He has been kind enough to allow us to use some of his results in this paper. Heckel has found that normal adult male urine gives positive tests using the technic that we have described, but if the amount of urine is decreased the tests become negative. He found that 2 c.c. of urine is the ideal amount for testing purposes as this gave consistently negative results in normal adult males. Boiling of the urine did not destroy the active principle in the production of the test. In six male patients with testicular atrophy based upon a previous parotitis, the tests were all negative even when using 4 c.c. of urine. In three male patients with testicular tumors (one teratoma, one chorionepithelioma, and one of undetermined origin), the tests were all positive on using 2 c.c. of urine. More details of this work will be available when Heckel makes his formal reports.

In testing the urines of several boys between the ages of seven and ten, it was found that the tests were negative as were those on several girls under ten. This is interesting so far as it suggests further problems, mainly the testing of urines

cerebral artery. It could only reach there in the presence of some gross developmental defect in the heart. We believe in this case that the original embolus produced pulmonary infarction from which were detached the emboli which produced the fatal result.

DR. STOCKARD.—But you would have to have pulmonary breakdown.

DR. MADDEN.—You would have to have pulmonary infarction first, which was actually present in this case. Furthermore, we found thrombi in those areas from which undoubtedly arose the embolus to the brachial artery and the cerebral artery.

A CLINICAL STUDY OF THE EFFECT OF CAMPHOR-IN-OIL ON LACTATION

MILTON D. KLEIN, M.D., NEW YORK, N. Y.

(From the Obstetrical Service of the Morrisania City Hospital)

IN THE past few months, camphor-in-oil has been used on selected postpartum patients at the Morrisania City Hospital. Ninety out of 1,000 patients were studied, and it is the object of this report to summarize the clinical effects observed regarding the action of camphor on the breasts.

The effect of camphor on the breasts was first noted clinically in 1922 by J. Rosenblatt¹ who observed that when camphor was given to nursing mothers for cardiac disorders, it caused a reduction in the excretion of milk and within a few days, complete cessation of lactation. He did not offer an explanation for this action. Philpott in 1929² and McNeile in 1935³ also reported that camphor-in-oil had a definite inhibitory action on lactation. Liegner⁴ attempted to determine experimentally the effect of camphor on the breasts of puerperal guinea pigs whose young were weaned at birth. He observed that with camphor involution of the secretory portion of the mammary gland began on the second day and was complete within five days. In his control series, however, involution first occurred on the fifth day. These results led him to conclude that camphor was a causative factor in hastening the involutionary process in the breast.

The indications for interrupting lactation are listed in Table I.

TABLE I. INDICATIONS

INDICATIONS	GROUPS		
	I	IIA	IIB
Prematurity (dead baby)	6	7	6
Unwed mothers	5	0	9
Monstrosities	1	2	2
Tuberculosis	2	1	1
Stillbirths	14	7	10
Cracked nipples	2	5	1
Breast tumor	0	1	0
Cardiac, Grade III	0	1	1
Eclampsia	0	1	0
Pneumonia	0	1	0
Sepsis	0	4	0
Total number of cases	30	30	30

estrogenic hormone increase is not rapid, it may be possible that the ovipositor lengthening function demands less concentration for detection than does the Allen-Doisy method of testing for this hormone. At any rate, we have demonstrated in our tests parallel to Friedman tests that in cases where the ovum is dead the test dependent upon the estrogenic hormone has more value than does one which utilizes the gonadotropic hormone. We feel that in conjunction with one of the other biologic tests, the test upon the bitterling will prove of value as an aid in diagnosis where ectopic pregnancy, incomplete abortion, missed abortion, placental polyp, or any other condition where the death of the fetus is suspected. In fairness to the test may we urge that it not be used indiscriminately on unknown urine as a test for pregnancy but rather that it be considered an aid in diagnosis in such cases where the history, physical and pelvic findings, and one of the other biologic tests have failed to co-ordinate, and further substantiation is advisable. Only when we are familiar with all the facts in any clinical problem can we apply the test as a diagnostic aid in pregnancy conditions.

We are now engaged in checking the work that is embodied in this and our previous report as well as upon new problems in this field. In our future studies we shall attempt to determine, by studies on the blood and urine of normally menstruating women, just what concentration of estrogenic hormone is necessary to produce a positive test and possibly show that we are dealing with a biologic reaction which is more sensitive to that hormone than are the other methods now available.

In conclusion, our work shows that only those preparations containing estrogenic substance can influence ovipositor lengthening. Pregnancy urine, urine from nonpregnant women at certain stages in the menstrual cycle, urine from sexually active males, urine from women with cystic mastitis, and extracts of some tumors give positive tests. We also must conclude that the activating hormone is heat stabile, and apparently ether soluble.

REFERENCES

- (1) *Kanter, Aaron E., Bauer, Carl P., and Klawans, Arthur H.*: J. A. M. A. 103: 2026, 1934. (2) *Szusz, Ferenc*: Orvosi Hetil 77: 905, 1933; Monatschr. f. Geburtsh. u. Gynäk. 96: 292, 1934. (3) *Fleischmann, Walter, and Kann, Susanne*: Arch. f. d. ges. Physiol. 230: 662, 1932. (4) *Ehrhardt, K., and Kuhn, K.*: Zentralbl. f. Gynäk. 58: 2834, 1934. Endokrinologie 14: 245, 1934; Endokrinologie 15: 1, 1934; Monatschr. f. Geburtsh. u. Gynäk. 94: 1, 1933. (5) *Kotz, J., Douglas, H. S., and Parker, E.*: AM. J. OBST. & GYNEC. 30: 155, 1935. (6) *Doisy, Edward A.*: In Sex and Internal Secretions, Baltimore, 1932, Edgar Allen, Williams and Wilkins Co., Chap. 10, pp. 481-494. (7) *Baumann, E., and Szusz, Ferenc*: Zentralbl. f. Gynäk. 95: 1104, 1935. (8) *Fleischmann, Walter, and Kann, Susanne*: Klin. Wchnschr. 14: 644, 1935. (9) *Kleiner, Israel S., Weisman, Abner I., and Barowsky, Harry*: J. A. M. A. 104: 1318, 1935. (10) *Aschheim, Selmar*: J. A. M. A. 104: 1934, 1935. (11) *Goldberger, Morris A., Salmon, Udall J., and Frank, Robert T.*: J. A. M. A. 103: 1210, 1934. (12) *Frank, Robert T.*: J. A. M. A. 97: 1852, 1931. (13) *Heckel, Norris J.*: Personal communication. (14) *Melnick, Perry J., and Kanter, Aaron E.*: AM. J. OBST. & GYNEC. 27: 41, 1934.

310 S. MICHIGAN AVENUE

55 E. WASHINGTON STREET

exhibited a first degree engorgement before the administration of camphor and in each instance, regression started in six hours and was complete after twenty-four hours. The remaining 26 patients showed either a second degree or a third degree reaction before the injections were started. Those showing the second degree reaction failed to develop a third degree engorgement after the treatment was instituted. Furthermore, regressive changes took place in twelve hours and were complete in forty-eight hours. Approximately the same course occurred in the breasts of those patients who showed a third degree reaction before treatment. After twelve hours, involution began and was complete in less than seventy-two hours (Fig. 3). There was one exception. This patient ran a course similar to the third degree reaction of the control group. The coincidence of breast improvement, following the use of camphor, points to the possibility that the drug exerts in some way an inhibitory influence upon lactation. Here again, the factors of age, duration of pregnancy, parity and indication for weaning were considered as to their possible effect upon involution and were found to be negligible.

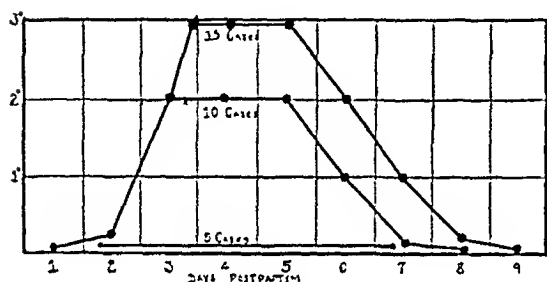


Fig. 1.—Lactation curve, control Group I.

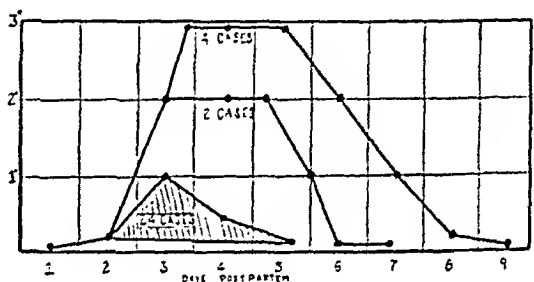


Fig. 2.—Lactation curve, Group IIa.

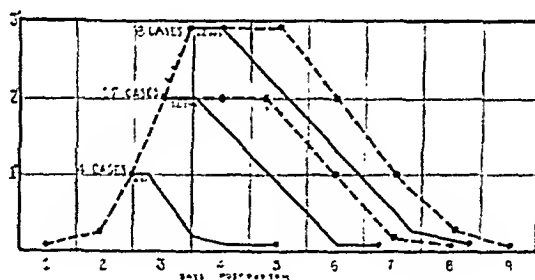


Fig. 3.—Lactation curve, Group IIb. Dotted line represents lactation curve of control Group I. Solid line represents curve of Group IIb.

In the entire series of 90 cases, there were 12 patients who had a temperature of 100.4° F. or more for forty-eight hours or longer. In only 2 cases could the elevation of temperature be attributed to the engorgement of the breasts. One case was in the control series and the other in a patient in Group IIb, with a third degree engorgement before camphor was instituted. Therefore, camphor-in-oil in this series did not increase the morbidity. It is of interest to note that there were 2 patients in this group who complained of reactions that might be attributed to the use of camphor. One stated that she felt a numbness of both legs, occurring five minutes after the first injection and lasting ten minutes. The other complained of a drawing sensation down both legs lasting half an hour, occurring ten minutes after the first two injections. This patient also claimed that she had a feeling of drowsiness and dizziness following the first injection and lasting one hour. Physical examination failed to reveal findings to explain these symptoms. Whether these local and general reactions were due to camphor-in-oil is difficult to determine.

MECHANICS OF UTERINE SUPPORT AND POSITION*

I. FACTORS INFLUENCING UTERINE SUPPORT (AN EXPERIMENTAL STUDY)

WILLIAM F. MENGERT, M.D., IOWA CITY, IA.

(From the Department of Obstetrics and Gynecology, State University of Iowa)

SO MANY theories are current concerning the mechanism of uterine support that it seemed worth while to attempt a quantitative evaluation of the relative importance of every possible means by which the uterus may be retained in the pelvis. The method employed, namely, traction on the uterus of a cadaver, was used in 1858 by Legendre and Bastien.⁶

MATERIAL AND METHOD

The material comprised eight cadavers. Table I shows the age at time of death, the interval which elapsed between death and the experiment, and gives detailed data concerning each subject. All of the subjects were in states of normal nutrition at the time of death, and the pelvic organs were normal to inspection. There were no evidences of prolapse of the uterus or vaginal walls.

Each body lay supine in the usual position for postmortem examination. After the abdomen had been opened by the usual midline incision, a tenaculum was placed on each lip of the cervix and a string bearing a 1 kg. weight was passed over a pulley at the foot of the table and attached to the tenacula. The uterus was thus subjected constantly to the traction of 1 kg. exerted in the long axis of the body. A meter bar was laid on the table between the legs of the cadaver, parallel to the course of the string from cervix to pulley, and a convenient point to serve as a marker was chosen on the string. By observing the relation of this point to the meter bar it was possible to measure accurately the descent of the uterus as successive structures were severed.

The distance from cervix to introitus was measured and recorded at the beginning of each experiment (Table I).

The paired structures attached to the uterus were then severed in varying sequences. For the purposes of this study eight pairs of structures were recognized, as follows: (1) round ligaments, (2) ovarian and infundibulopelvic ligaments, (3) upper third of the broad ligaments, (4) lower two-thirds of the broad ligaments, (5) upper third of the paravaginal tissues, (6) middle third of the paravaginal tissues, (7) uterosacral, and (8) pubocervical ligaments. In addition, the pelvic floor musculature was considered as a possible support of the uterus. In two subjects (Nos. 6 and 8) the vagina was detached from the cervix by circumcision early in the experiment. Obviously, this procedure eliminated the paravaginal tissues from consideration in these two subjects.

RESULTS

The descent of the uterus following section of each pair of structures is recorded in Table II. It will be seen that division of the round, ovarian, infundibulo-

*Read at the Seventh Annual Meeting of the Central Association of Obstetricians and Gynecologists, held at Omaha, Neb., October 10 to 12, 1935.

The second paper of this series will be published in the June issue.

Society Transactions

NEW YORK OBSTETRICAL SOCIETY

MEETING OF NOVEMBER 12, 1935

The following papers were presented:

An Unusual Case of Postoperative Embolus. Dr. John J. Madden. (For original article, see page 891.)

Is Superfetation Possible in the Human Being? Dr. William E. Studdiford. (For original article, see page 845.)

MEETING OF DECEMBER 10, 1935

The following papers were presented:

Mild Toxemias of Late Pregnancy. Dr. W. W. Herrick. (For original article, see page 832.)

Intestinal Injuries Following Irradiation for Cancer of the Cervix. Dr. James A. Corscaden.

OBSTETRICAL SOCIETY OF PHILADELPHIA

MEETING OF NOVEMBER 7, 1935

The following paper was presented:

Behavioral Consequences of Cerebral Birth Lesions. Dr. Edgar A. Doll. (For original article, see page 866.)

CHICAGO GYNECOLOGICAL SOCIETY

MEETING OF NOVEMBER 15, 1935

The following papers were presented:

The Influence of Medical Diseases on Obstetric and Fetal Mortality. Dr. Edward Allen and Dr. Carl P. Bauer. (For original article, see page 885.)

Surgical Complications in Pregnancy. Dr. Fred O. Priest. (For original article, see page 878.)

Antepartum Fetal Death. Dr. D. A. Horner.

Positive and Permanent Identification of the Newborn. Dr. Gilbert P. Pond.

TABLE II. DESCENT OF UTERUS FOLLOWING DIVISION OF SUPPORTS

Note the varying sequences in which the various uterine supports were severed. Also that uterine descent occurred when parametrial and paravaginal tissues were divided, and did not occur to any marked degree with division of the structures attached to the fundus of the uterus even when they were the last structures to be cut.

UTERINE SUPPORTS		ORDER OF DIVISION OF SUPPORTS								MEASURED DESCENT IN CENTIMETERS (CONSTANT TRACTION OF ONE KILOGRAM ON CERVIX)								AVER- AGE
		1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	
CADAVER NUMBER																		
Round ligament		1	6	1	3	2	5	2	5	0.25	0.50	0.00	0.25	0.00	0.50	0.00	0.50	0.3
Ovarian and infundibulo- pelvic ligament		2	5	2	4	4	6	6	5	0.25	0.00	0.00	0.25	0.70	2.25	0.25	0.25	0.5
Para- metrial		*	5	3	5	4	3	3	6	†	0.00	0.00	0.00	0.00	0.00	0.25	0.25	0.1
Lower two-thirds		5	3	6	6	5	3	5	3	1.00	1.25	2.50	4.50	4.50	2.00	0.50	2.50	3.6
Para- vaginal		*	2	7	2	5	*	6	*	†	1.25	2.50	1.70	4.50	†	6.00	†	2.6
Upper one-third		*	*	8	*	*	*	5	*	†	†	2.50	†	†	†	6.00	†	4.3
Middle one-third		3	4	4	*	1	4	4	4	0.00	1.00	0.00	†	0.30	1.50	0.50	4.50	1.1
Uterosacral ligament		4	1	5	1	3	2	1	1	0.00	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.1
Pubocervical ligament		6	*	*	*	3	1	*	2	†	†	†	†	†	†	†	†	†
Vaginal circumcision																		

*Support not cut.

†Measurement not obtainable.

can one explain such diseases as partial gigantism, dysthyreosis, Basedow's disease without increase and changes in morphology of the thyroid gland, etc.

ALEXANDER GABRIELIANZ.

Raab, V.: About Fat Regulating Metabolism Substance of the Hypophysis "Lipoitritin," *Vestnik Endocrinologii* 4: 224, 1934.

Anterior and posterior lobes of the hypophysis contain a substance specifically acting upon fat metabolism (Lipoitritin). It is thermostabile and is destroyed by alkali.

Action of lipoitritin consists in prolonged decrease of the amount of fat in the blood of dogs. In the human, alimentary glycemia disappears after injection of this preparation. The hormone acts upon a center lying in the tuber cinereum.

The physiologic task of lipoitritin, it seems, is controlling those parts of the thermoregulating center which influence caloric utilization of fat.

Hypophyseal and cerebral obesity are explainable as the result of breaking off the neurohormonal mechanisms of utilization of the fat.

ALEXANDER GABRIELIANZ.

Swezy, O.: Some Pitfalls in the Study of Sex Hormones, *J. Lab. & Clin. Med.* 19: 561, 1934.

To correlate certain phases of work concerning the interrelations between the gonads and the anterior hypophysis, the author in a review of the literature calls especial attention to some of the pitfalls in the study of sex hormones. These may be enumerated as follows:

The same criteria of the efficacy of administration of sex hormones is fairly general, viz.: The weights of the gonads of immature animals receiving injections for a short period, the opening or closure of the vagina, the tests in many cases being repeated in the same animals. It has been shown that the ovary has no necessary relation to the vagina upon experimental hormonal injection and further that these vaginal changes may occur with no corresponding changes in either uterus or ovary. The vaginal smear method is, therefore, an unsuitable one for sole reliance as an assay test for sex hormones, and it accounts for many of the variable results reported. Likewise, the practice of using the same animals repeatedly at frequent intervals without rest periods may produce variable results.

The use of the weight of the ovary as an assay test is likewise no infallible guide to the kind of change induced by hormone treatment. A considerable amount of follicular growth may be found without a significant increase in the weight of the ovary. The relation of estrin or the factor inducing cornification in the vagina of rodents to folliculin or factor inducing growth in the endometrium is fraught with confusion. Under experimental conditions it seems that the factor inducing cornification is not identical with that inducing growth in the uterus. Their assumed identity has resulted in the widespread use of the vaginal smear test as the important one in the assay of these hormones. Some believe a single hormone may be responsible for the changes in the uterus and vagina, the relation being a quantitative one; others that two factors are involved. Cornification has no recognized place in the human cycle and, therefore, a clarification of these relations and the hormones associated with them can be obtained only by more critical analyses of the experiments conducted with them.

In all experimental work on normal animals, the hypophysis of the test animal largely decides the results when sex hormones are being studied. This is probably due to an activator in some preparations, including human pregnancy ex-

of vaginal hysterectomy. . . . Let him incise the vaginal wall right around the cervix, and, after opening the pouch of Douglas, let him freely divide the posterior attachments. Further let him separate the bladder completely from the uterus and make a wide opening into the uterovesical pouch. The uterus cannot as yet be pulled down much more than before the operation was begun. The something which supports the uterus has not as yet been divided. Next let the operator deliver the fundus through the anterior portion of the incision. This affords another proof that the broad ligaments and round ligaments have no value as suspenders, for they come down freely and without being stretched. Let them be tied and divided, and the uterus still remains fixed by the tissue known as the parametrium, and by this alone. Until this is divided on either side the organ is, for practical purposes, as completely supported as before an incision was made."

This opinion is correct as far as it goes, but the present experiments show that the paravaginal support is fully as important as the para-

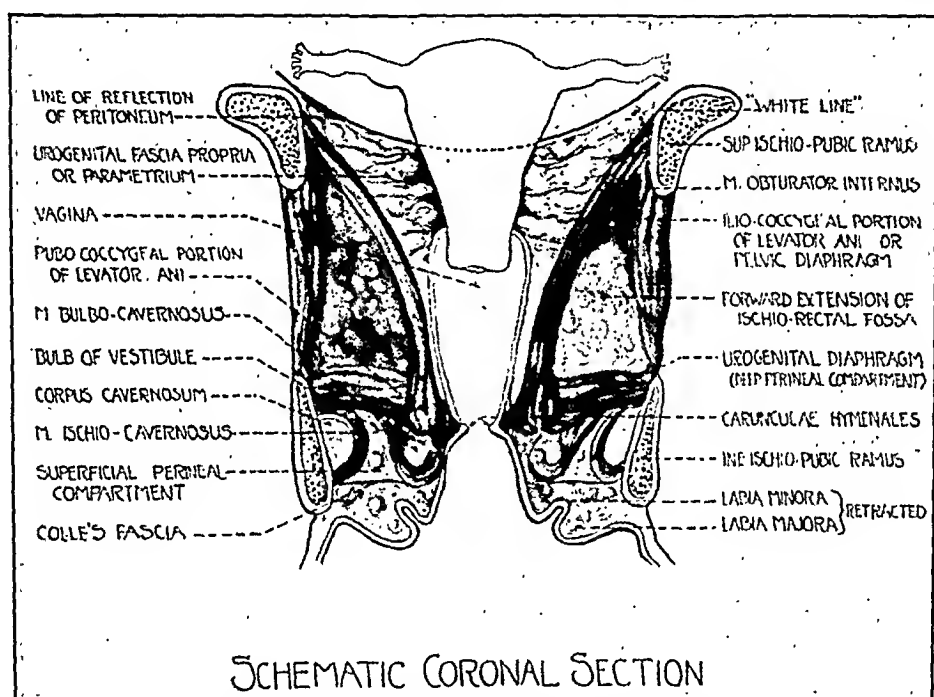


Fig. 1.—Modified by E. W. Scheldrup from an original drawing by H. J. Prentiss. Note the fan-shaped paravaginal and parametrial tissues, or urogenital fasciae propria, extending almost from the bottom of the vagina to a point slightly higher than halfway up the uterus. This tissue derives support from the ilioecoccygeal portion of the levator ani muscle, or the pelvic diaphragm.

metrial, if not more so. Sixty-five per cent of the average descent (10.5 cm.) which occurred when both the parametrial and paravaginal structures were divided was referable to loss of the latter. Furthermore, in three instances in which all of the uterine connective structures above the vagina were severed, noticeable descent did not occur, indicating that the vagina not only has its own support but can maintain the uterus as well. Bonney¹ recognizes the importance of the paravaginal tissues as a supportive medium and describes them as "... two fan-shaped expansions of fibromuscular tissue, which, arising on each side along the whole length of the lateral vaginal walls above the

Wodon, J. L.: *The Menopause and the Biological Diagnosis of Pregnancy*, Rev. franç. de gynéc. et d'obst. 29: 927, 1934.

During the menopause, whether spontaneous or artificially produced, one sometimes finds in the urine a substance which is capable of producing follicular hemorrhages in the rabbit, in spite of the absence of pregnancy. Under such conditions the Aschheim-Zondek test presents the same possibility of error as the Friedman test. Since the substance which is responsible for the follicular hemorrhages is weaker than it is during normal pregnancy, an error in biologic diagnosis may be avoided by simultaneously injecting two animals, one with 15 c.c. and the other with 5 c.c. of urine. A diagnosis of pregnancy should not be made unless both rabbits show a positive reaction.

J. P. GREENHILL.

Pratt, J. P.: *The Human Corpus Luteum*, Arch. Path. 19: 380 and 545, 1935.

Pratt reviews the recorded studies of the human corpus luteum. He considers first its history, origin, macroscopic and microscopic structure, maturation, physiology, chemistry, and pathology. His comments are as follows: The literature on corpus luteum is voluminous with often no distinction made to indicate the species studied. It is difficult, therefore, to separate references to human beings from those of lower animals. In many instances no distinction is made between estrus and menstruation. However, animal experimentation has laid the foundation for interpretation of human problems. There is quite general agreement as to the anatomic structure of the corpus luteum but the concept of its function is still in transition. Accumulated knowledge of the past has been of value but the recent progress in chemistry epitomized by the isolation of theelin in pure crystalline form from many sources including the corpus luteum and the isolation of progesterin from corpora lutea of some animals, marks the beginning of a new era.

The discovery of the control of ovarian function by the anterior lobe of the hypophysis is important but it is unwise to predict that all disturbed functions of the gonads can be regulated by the administration of incertions of the anterior lobe. The physiologic function intrinsic within the gonads must account for some of the major phenomena of the reproductive cycle. With these new developments it is possible to hope that eventually a rational therapy will be developed. Many therapeutic ventures to prevent disturbances of nidation have been based on the assumption that the corpus luteum is essential to nidation. Until more evidence is adduced to show that a specific hormone is provided by the corpus luteum which influences nidation, such therapy must be classed as empirical. Interpretation should be critical so that progress may continue.

W. B. SERBIN.

Fluhmann, C. F.: *A New Procedure for the Demonstration of Estrin in the Blood of Women*, Endocrinology 18: 705, 1934.

Fluhmann describes a biologic test for the demonstration of estrin in the blood of women. The test depends on the injection of small amounts of untreated serums into spayed mice. A positive result is indicated by the production of a "mucification" of the vaginal mucosa. The method may be applied to quantitative studies, provided a sufficient number of test animals are employed.

The examination of 80 specimens of blood obtained from 46 women at different stages of their menstrual cycles showed that the maximal concentration of estrin

The parametrial and paravaginal tissues are identical anatomic structures. The latter are merely continuations of the former, and separate terms are used only for greater exactness in localization. Many names have been given this tissue, such as endopelvic fascia, urogenital fascia propria (Prentiss⁸), cardinal ligaments, etc., but to avoid confusion the descriptive terms "parametrial and paravaginal tissues" are used.

There has been much discussion concerning the nature of these tissues.

Spalding⁹ speaks of a definite vesicovaginal fascia, whereas Goff³ feels that there is no tissue in the walls of the vagina, urethra, bladder, and rectum which can logically be termed fascia. However, he thinks that there is a thin layer of fascia of the areolar type between the anterior vaginal wall and bladder and between the posterior vaginal wall and rectum. Koster⁵ in a study of the recto- and vesicovaginal septa finds ". . . no evidence of existence of any fascial structure comparable to that described in any of the texts." He does find, however, ". . . a loose, areolar connective tissue which can have no restraining or supportive value." Fothergill² believed that ". . . the fascia should be regarded as the sheaths of the muscles, the vessels and the viscera." Bonney¹ says, "The description of them [cardinal ligaments] as perivascular sheaths is altogether wrong, for they not only lie considerably below the uterine arteries as the latter proceed from the hypogastric arteries to the sides of the uterus, but they contain no vessels to speak of."

A continued discussion of the nature of this tissue and whether it is fascial or loose areolar connective tissue is outside the scope of this paper. From the present study of eight female cadavers it appears that when the upper two-thirds of the paravaginal and the lower two-thirds of the parametrial structures are divided, a 1 kg. weight attached to the cervix is sufficient to cause an average uterine descent of 10.5 cm. It is of little moment whether this tissue should be classified histologically as ligament or fascia. The important point is that *it did support the uterus in eight fresh cadavers.*

SUMMARY AND CONCLUSIONS

1. The following experiment was performed on eight female cadavers, none of which had prolapse: After attaching a 1 kg. weight to the cervix, the paired structures attached to the uterus were severed in varying sequences and the resulting uterine descent measured.

2. Section of the round, ovarian, infundibulopelvic, and the upper third of the broad ligaments hardly affected the position of the uterus in the pelvis.

3. The pelvic floor, although it was never incised, did not hinder experimental prolapse of the uterus, and therefore could not have contributed to uterine support in any of the eight subjects.

4. Section of the parametrial (lower two-thirds of the broad ligament) and the upper two-thirds of the paravaginal tissues allowed an average uterine descent of 10.5 cm.

because most of the folliculin is retained in the organism in one form or another. During the treatment the subjective symptoms disappear, which seems to indicate that these symptoms are due to a lack of folliculin, and not to an increased secretion of prolan A. The investigations confirm the importance of an hormonal analysis in patients who have been subjected to a partial removal of the adnexa, as by this means it is possible to assure oneself of the functional ability of the remaining ovarian tissue. This is of great importance for a decision on the necessity of a later hormonal substitution therapy.

J. P. GREENHILL.

Lassen, H. C. A., and Brandstrup, E.: Serial Studies on Occurrence of Prolan A and B in Urine of Women Castrated by X-ray Treatment or by Operation, *Acta obst. et gynec. Scandinav.* 14: 89, 1934.

In 36 cases of x-ray castration and in 10 cases of operative castration, a total of 436 tests for prolan in the urine were made about once a month for from three to thirty-one months after castration. With the technic employed in these tests, prolan could be demonstrated only when present in amounts above 400 M.U. per liter of urine.

The prolan A reaction was positive in about 30 per cent of all the urine specimens (343) examined after the irradiation; the prolan B reaction was positive in 7 per cent. The frequency of the prolan A reaction was almost the same throughout the observation period; the prolan B reaction was most frequent (11 to 12 per cent) during the first half year after castration.

Positive prolan A reaction was found in about half of the urine specimens (93) examined after operation; prolan B reaction in 9 per cent. The prolan reactions are most frequent during the first six months after operation. All 10 patients excreted, at some time or other after operation, prolan A in amounts above 400 M.U. per liter of urine, most of them within the first half year after operation. Six patients gave positive prolan B reaction within the same period.

In the 35 cases in which both the prolan A and B reactions were positive, HVR-II was positive in 24. In control material suitable for comparison, tests with the technic employed gave prolan A reaction in 15 per cent of the cases and prolan B reaction 1 to 2 per cent. Sixty-three patients in the climacteric age showed, with one test in each case, prolan B reaction in 14 per cent of the cases.

J. P. GREENHILL.

Nelson, W. O.: Concerning the Anterior Pituitary-Gonadal Interrelations, *Endocrinology* 19: 187, 1935.

Cell counts on the anterior lobes from 68 normal male and 56 normal female rats have shown that the male gland has a higher percentage of basophiles and acidophiles and a lower percentage of chromophobes than that of the female. The anterior pituitaries from 25 castrate male and 17 spayed female rats which had been injected with estrin showed a profound decrease in the percentage of both castration cells and nonvacuolated basophiles.

That the suppressing influence of the gonads on the gonadotropic activity of the hypophysis appears to be conducted through the action of the gonad hormones, particularly estrin, on the secretory cycle of the anterior lobe basophiles has been suggested. On the basis of the above physiologic and histologic evidence indicating a fundamental difference in the sensitivity to gonad hormone on the part of the male and female hypophysis, an explanation is offered for the cyclic character of female reproduction and the absence of a cycle in the male. In the female the production of estrogenic hormone decreases with lack of stimulation, the gonado-

The enumeration of the subjective symptoms and several associated conditions and the frequency with which they occurred in the present series of 85 patients follows:

SUBJECTIVE SYMPTOMS	INCIDENCE
1. Exhaustion, tire easily	80
2. Irritability and nervousness	81
3. Emotional instability (weeping, depression, suicidal tendency, disturbing dreams)	69
4. Backache	43
5. Headache (migrainoid)	29
6. Insomnia	16
7. Soreness of breasts	39
8. Leg pains	18
9. Nausea or vomiting	23
10. Cramping	31
11. Vaginal irritation	17
12. Hot flashes	18
13. Decrease or lack of sexual desire	13
14. Decrease or lack of normal sexual reaction	16

ASSOCIATED CONDITIONS	INCIDENCE
1. Acne	5
2. Arthritis	19
3. Colitis	15

The favorable results of estrogenic therapy in the menopause have been demonstrated and accepted, and nothing further will be added at this time. Eighteen menopausal cases were included in the series as a basis for comparison with the remaining 67 younger women from nineteen to forty-three years of age. The symptoms previously enumerated are vividly descriptive of a type of patient with whom we are all familiar, i.e., the tired nervous woman, who, married or unmarried, presents with many of the above symptoms some form of maladjustment of marital or sexual life. Physical and laboratory examination revealing no abnormalities, our only solution has been to assure her of the absence of findings, inform her that she is just "tired" or "nervous" and suggest rather dubiously that rest and a "tonic" may be all that is needed with the result that the derangement either adjusts itself spontaneously or becomes progressively worse.

The syndrome as indicated by the history may be either primary or secondary, in some patients being present since adolescence and in others being initiated or exaggerated by subsequent menstrual or reproductive events. They have therefore been classified according to reproductive types for further consideration.

	NO. OF CASES	AGES
Type I. Nulliparous	19	21 to 36
Type II. Parous	27	19 to 43
Type III. Immediate postpartum	5	25 to 34
Type IV. Sterility	12	23 to 38
Type V. Menopausal	18	30 to 81

Type I. Nulliparous.—The menstrual history in 16 instances indicated the presence of primary estrogenic deficiencies. In the remaining 3, the deficiency was secondary.

Bleeding began four days after the last injection of this hormone and continued for ten days. A slight progestational reaction appeared during the period of injection of the corpus luteum hormone.

Punch biopsy is a safe and reliable method of obtaining endometrium for clinical and research purposes, and offers a means of differentiating luteal from aluteal bleeding.

"Swiss-cheese" pattern is not a constant accompaniment of endometrial hyperplasia and the diagnosis of this condition can and should be made in its absence.

J. THORNWELL WITHERSPOON.

Selye, H., Collip, J. B., and Thomson, D. L.: *Endocrine Interrelations During Pregnancy*, *Endocrinology* 19: 151, 1935.

In the rat, ovariectomy during gestation was found not to interfere with the life of the placenta. It terminates pregnancy only because it causes death of the fetus; and the dead fetus, if it is large enough at the time of the intervention, will cause the abortion of the whole gestation sac, simply acting as a foreign body. The probable cause of death of the fetus is the partial involution of the uterus which considerably increases the pressure in the gestation sac.

The placenta of the rat must produce the corpus luteum hormone, since the uterus was found to show distinct progestational changes, and the mammary gland to be maintained in a well-developed condition for as long as six days after the simultaneous removal of the ovaries and all the embryos.

The placenta survived in apparent functional integrity after removal of the ovaries and the fetuses, hence it is independent of ovarian hormones even in the rat, a species in which ovariectomy invariably terminates gestation. Since the life-span of the placenta was not markedly influenced by the removal of the embryos, the length of the gestation period must be determined by factors inherent in the placenta.

J. THORNWELL WITHERSPOON.

Rosenblat, J., and Nathan, F.: *Modifications of the Ovaries of Pregnant Women and Pregnant Rabbits as an Expression of an Aschheim-Zondek Autoreaction*, *Rev. franç. de gynec. et d'obst.* 29: 104, 1934.

There is very little in the literature concerning the changes in the ovaries of pregnant women. Since 1931 the authors have had occasion to examine the ovaries of 10 women during operation for extruterine pregnancy. Only healthy ovaries were studied. In every single case the authors found an increase in size of the ovary, a distinct extravasation in the graafian follicles, hence reactions which are characteristic of the Aschheim-Zondek test for pregnancy. Since microscopic control of these cases could not be undertaken, the authors performed experiments on animals. They found among pregnant rabbits the same changes which they observed in mice and immature rabbits after the injection of urine obtained from pregnant women. The authors conclude that the action of hormones which circulate in the blood of pregnant women and of pregnant rabbits is much more extensive than heretofore known.

J. P. GREENHILL.

Anker, H., and Laland, P.: *Investigation of Prolan in Emesis and Hyperemesis Gravidarum*, *Acta obst. et gynec. Scandinav.* 14: 310, 1934.

The authors investigated the urine, blood serum, and gastric contents of five patients with hyperemesis and ordinary vomiting of pregnancy. In two they found subnormal prolan contents in the urine. In five they found an excessive prolan

as an adjunct to the basic oral therapy. Complete data regarding the commercial preparations available are presented in the *Journal of the American Medical Association*, August 31.⁵

TREATMENT

Therapeutic results in this series were greatly enhanced by the fact that it was composed entirely of private patients from whom it was possible to obtain intelligent cooperation. They were informed that even though they obtained prompt relief of symptoms, it would be necessary to continue some form of therapy for at least four to six months to obtain permanent results.

The varying degrees of deficiency encountered necessitated the development of a generalized therapeutic plan which could be varied in accordance with the degree of deficiency present as indicated by the symptomatic response. The basic treatment consisted of the oral administration of "emmenin" (Collip). The patient was instructed to take one dram 20 (day-oral) units three times daily in one-half glass of water one hour before meals except during the time of the menstrual flow, emphasis being placed on the necessity for resuming the oral medication immediately after cessation of each menses.

It was determined that the most favorable time to begin the therapy in all except the amenorrheic patients was during the phase of follicular activity or immediately following the cessation of the menstrual period. In many instances, particularly when the subjective symptoms were mild in character, partial or complete relief was obtained within forty-eight hours. Failure to obtain complete relief, or recurrence of the symptoms at any time prior to the next menstrual flow, was used as an indication for the addition of parenteral therapy. Amniotin in oil, 8,000 I.U. was administered as frequently as necessary to produce complete relief of symptoms. The amount of parenteral therapy ranged from 8,000 to 32,000 I.U. daily, and was increased or decreased as indicated by the response of the symptoms. It was found that the greatest amounts were necessary at the times when normal estrogenic depletion occurs, either at the time of ovulation or immediately preceding the menstrual periods. After relief of the subjective symptoms had been obtained, the need for parenteral therapy decreased rapidly. Subsequently occasional injections were necessary only at the time of greatest estrogenic depletion and it eventually was found possible to maintain freedom from symptoms by oral therapy only, even in the Group III cases.

Although sufficient time has not elapsed with most of the cases in this series, permanent results are being obtained by means of a small maintenance dose, with the possibility that medication may eventually be stopped entirely. This is indicated by the results of Severinghaus and

The author's researches have led him to reject all earlier theories ascribing hirsutism to the internal secretion of tumors arising in a hypothetical testicular component of the embryonic ovary.

J. P. GREENHILL.

Novak, E.: The Endocrine Effects of Certain Ovarian Tumors, *Am. J. M. Sc.* 187: 599, 1934.

Certain tumors of the ovary are capable of highly developed endocrine function. The two most clearly defined types are the granulosa cell tumors, and the so-called arrhenoblastomata. The granulosa cell tumors exert a feminizing effect, through the production of theelin by the tumor cells, so that in older women, even beyond the menopause, they produce most often a hyperplasia of the endometrium, associated with periodic bleeding and increased size of the uterus. In the few cases seen in very young children, they have produced the syndrome of precocious puberty.

The arrhenoblastomata, on the other hand, have a definitely masculinizing tendency, as might be expected from the fact that they apparently have their origin from undifferentiated epithelium in the region of the rete ovarii. Under conditions which are not clear these cells, capable of developing along either male or female lines, may assume definitely masculine tendencies, such as amenorrhea, breast atrophy, masculine hair distribution, deepening of the voice, and hypertrophy of the clitoris. Removal of the tumor brings about a regression of these symptoms.

J. THORNWELL WITHERSPOON.

Brindeau, Riehl; Hinglais, H., and Hinglais, M.: The Presence of a Large Amount of Luteinizing Hormone in the Urine in a Case of Lutein Cyst, *Bull. Soc. d'obst. et de gynéc.* 24: 38, 1935.

The authors observed a second case of lutein cyst associated with secretion of prolans A and B. The amount of hormone present could lead one to suspect a pregnancy, but quantitative methods eliminated the diagnosis of pregnancy. The amount of prolans B in the urine of the present case (120 units per liter) is the largest the authors have ever recovered outside of pregnancy or a chorionepithelioma. They have never obtained more than 100 units from a nonpregnant individual. They therefore believe it best to fix the upper limit at 150 units in order to eliminate any errors in the diagnosis of pregnancy. The hormone disappeared rapidly from the urine after the removal of the cyst.

J. P. GREENHILL.

Murphy, Douglas P.: The Excretion of Ovary Stimulating Hormone in the Urine During Pregnancy, *Surg. Gynec. Obst.* 56: 914, 1933.

The amount of ovary-stimulating hormone (expressed in rabbit units) in 30 twenty-four-hour specimens of urine of 24 pregnant women is recorded. Some patients were normal, others exhibited mild complications of pregnancy, the majority were in the last third of gestation when their urine was collected.

The amount of hormone excreted in twenty-four hours varied from less than 100 to more than 12,000 rabbit units; the majority of patients voided less than 2,000 rabbit units.

The excretion of hormone by the same individual from day to day was relatively constant and was independent of the output of urine.

From these observations, it is concluded that: (1) Variation in the output of urine has no significant influence upon the amount of ovary-stimulating hormone

where no deficiency existed. The only evidence of overdosage that has been observed has been a delay in the menses of from two to eight days, and reduction of dosage in 5 cases where this occurred was followed by return to normal.

COMMENTS

The results obtained can be explained only on a theoretic basis if we accept and consider certain experimental evidence.

It is known that the ovary produces at least two hormones, a follicular or estrogenic hormone "estrin" and the corpus luteum hormone "progesterin" or "corporin." It has been demonstrated that one of the actions of estrin is inhibition of the activity of the anterior pituitary gland and that progesterin either neutralizes or causes the excessive elimination of estrin.⁷ It is known that the anterior pituitary maintains a controlling action over the other glands of internal secretion and that it produces follicle stimulating and luteinizing hormones which act directly on the ovary.

The multiplicity of symptoms encountered can be explained only when we consider that the estrogenic deficiency causes the removal of the normal inhibition to the anterior pituitary gland and thereby permits derangement of function of the entire glandular system, and as maintained by Severinghaus,⁶ correction of this deficiency by estrogenic therapy replaces the normal inhibition of the anterior pituitary gland which in turn causes a return to normal of the entire glandular system with relief of symptoms. Where failures have been encountered or only partial success obtained, the indicated explanation would be either insufficient estrogenic therapy with inability to entirely control pituitary activity, or depletion of some other gland such as the adrenal, thyroid, or parathyroid to the extent that these glands no longer respond to normal pituitary control.

It is again desirable to call attention to the fact that the data presented are the results of clinical observation not substantiated by quantitative determination of estrin and prolactin content of the blood and urine, or by examination of endometrial tissue. Methods available for these determinations have contributed greatly to our knowledge of glandular function but due to their complexity and highly technical nature are not available for routine application.

Although conclusions based only on clinical results are frequently misleading, it is felt that the inferences indicated by the results of the present study are to a certain extent justified by the accumulation of laboratory and clinical evidence of the past five years. Preparations are being made to carry on the present work under the added control of blood and urine determinations of estrin and prolactin in an attempt to prove or disprove the following conclusions and to obtain additional information.

THE SINGLE WOMAN AND HER EMOTIONAL PROBLEMS. By Laura Hutton, Physician, Institute of Medical Psychology, London. William Wood and Co., Baltimore, 1935.

PSYCHOLOGY OF SEX. A Manual for Students. By Havelock Ellis. 377 pages. Emerson Books, Inc., New York, 1935.

THE TRUE PHYSICIAN. The Modern Doctor of the Old School. By Wingate M. Johnson, M.D. 157 pages. The Macmillan Co., New York, 1936.

THE BALANCED DIET. By Logan Clendening, M.D. Professor of Clinical Medicine, University of Kansas. Illustrated. 207 pages. D. Appleton-Century Co., New York, 1936.

Item

American Board of Obstetrics and Gynecology

The annual informal dinner and general conference of Diplomates of the American Board of Obstetrics and Gynecology attending the American Medical Convention will be held at the Hotel Kansas Citian, Kansas City, Missouri, on Wednesday, May 13, 1936, at 7:00 P.M.

At this dinner the successful candidates of the two preceding days' examinations will be presented in person, and short addresses will be made by two guest speakers and several members of the Board.

Diplomates of the Board and physicians interested in obstetrics and gynecology are invited to attend. Tickets (\$2.00 each) may be obtained from Dr. Joseph L. Baer, 104 S. Michigan Ave., Chicago, or at the door.

We have some eighty patients whose symptoms correspond closely with Dr. Schneider's group, but all of these patients have shown a fairly normal estrin content of the urine. Biopsy of the endometrium in many instances has borne this out. In this group, however, thirteen of twenty-one had evidence of excess pituitary function.

DR. JEAN PAUL PRATT, DETROIT, MICH.—About ten years ago I reported what I thought might be success with small doses of estrogenic hormone. In my first experiments I was misled into believing that very fine results were obtained, but with a careful check, I found the results were quite disappointing.

It seems increasingly difficult to know what symptoms to attribute to the menopause. A group in Chicago reporting on 1,000 women found that 85 per cent had no interruption of daily routine at the time of the menopause and only 15 per cent showed symptoms. If all these symptoms mentioned are due to interruption of ovarian function, it seems strange that the symptoms are so widely different in various individuals and so frequently entirely absent.

In our own hospital when some physician has made a diagnosis of menopausal symptoms, I ask him to observe the patient carefully and then send her to me for therapy. I will not tell him what therapy is to be employed. I have a preparation of theelin in oil and the same kind of oil without theelin sterilized and ready for injection. Just as much improvement has been noted with the oil without the theelin as there is with the theelin in the oil. I am not the observer, for the physician who refers the patient is the one who makes the notes on the change of symptoms. That is something that needs to be explained.

It has been known empirically for years that thyroid therapy has improved many of these patients. Quite recently it has been found that the ovary contains a far higher percentage of thyrotropic substance than the thyroid. So we now have another field open for investigation, namely, the thyrotropic hormone in the ovary.

There is also no question but that these women are psychically disturbed, and it seems to me that this comes back to something fundamental in the person. It seems important to correct psychic causes together with the others mentioned.

I believe there is a wider basis for menopausal symptoms than the lack of estrogenic substance in the ovary.

DR. MARK T. GOLDSTINE, CHICAGO, ILL.—Six years ago I started making a placental extract by practically the same method as that of Collip. In attempting to break down our placental extract for crystallization we also obtained a cloudy product which is comparable to Collip's APL but which we found had very little potency. Some of the men who were using this placental extract were given the new APL product and in a short time they corroborated our findings that APL had very little potency.

Does emmenin contain only follicular substance or does it also contain a great deal of the gonad-stimulating part of the placental extract? If the latter is true, we should be rather careful in administering it to young patients. I know from experience that some young women's ovaries are sensitive to placental extract and with large enough doses we can produce necrosis of the ovary. I am therefore going to be very cautious in the length of time I give emmenin in the dysmenorrhea cases. We have never used our own placental hormone except for functional bleeding. We have never used it for sterility.

DR. CARL P. BAUER, CHICAGO, ILL.—In our work it has been rather interesting in testing these various preparations on the reaction of the ovipositor of the bitterling to find the purer the product is the larger doses we have to use in order to produce a positive reaction. There is no question in my mind that there is something in the urine of pregnant women and also in the urine of women at various

The various clinical types of functional uterine bleeding may be described as follows:

1. *Puberty Bleeding* may begin with the very first period or may follow one or more apparently normal periods. Occasionally, menstrual irregularities of tempo, rhythm, and intensity may precede the abnormal flow. The bleeding is more or less periodic and the interval between periods is short and often attended by a brownish vaginal discharge. In some cases, however, the bleeding is nearly constant, lasting for weeks or months or even years. In the latter instances, the flow is not always profuse, there being periods of spotting and staining. Dysmenorrhea is usually absent; if present it is rarely severe.

The patients are usually thin. Hair is of normal distribution and not excessive in amount. Except for varying degrees of anemia due to blood loss, the general health is good. In some cases, the anemia may be very profound, the hemoglobin dropping as low as 25 per cent. In our experience, the follicular hormone content of the urine is usually low and occasionally no hormone is found in a twenty-four-hour specimen. We have never found it to exceed the normal 10 to 20 rat units per liter. Follicle-stimulating hormone is found in some instances, though not with any degree of constancy. Despite the diminished follicular hormone excretion, the secondary sex characteristics are fairly well developed. In some cases, however, uterine hypoplasia of variable degree has been found.

2. *Maturity Bleeding*.—In the majority of instances, the onset follows a pregnancy, whether full term, a miscarriage, or an ectopic. The previous menstrual history is not always normal; amenorrhea and oligomenorrhea are frequent. Dysmenorrhea is usually absent and rarely a prominent feature.

The patients may or may not be stout. Sometimes the obesity is of the so-called "endocrine" type of which there are three varieties:

- a. Trunk adiposity (extremities relatively thin. This is the most common form).
- b. Lower girdle adiposity (obesity confined to hips and lower extremities) and
- c. Upper girdle adiposity (obesity limited to shoulders, breasts and upper extremities. This is the least common form).

These endocrine types of obesity are often associated with varying degrees of hypertrichosis.

The secondary sex characteristics are usually well developed. The uterus is often slightly enlarged and softened, resembling an early pregnancy. In some instances, however, there is hypoplasia of the genital tract.

The anemia that may accompany maturity bleeding is rarely as severe as that of puberty bleeding. The follicular hormone content of the urine is exceedingly variable with a tendency toward subnormal values. Occasionally, follicle-stimulating hormone is found in the urine.

3. *Preclimacteric Bleeding*.—A similar type of functional bleeding very often occurs in women approaching the menopause and may be accompanied by the characteristic vasomotor symptoms of this period. The clinical and laboratory findings are comparable to those found in cases of maturity bleeding.

4. *Ovulation Bleeding*.—In some women, whose periods are otherwise normal, there may occur at the time corresponding to ovulation, a variable amount of uterine hemorrhage. Usually it does not amount to more than a bloody vaginal discharge of a few hours' to two or three days' duration. Occasionally, however, it is as long and profuse as the regular menstrual flow from which it is clinically indistinguishable. It is only by taking several successive endometrial specimens in these cases that one can differentiate ovulation bleeding from true menstruation. It is an in-

canal, and the other two parts being placed in each vaginal fornix. The vaginal portion of this radium application was filtered by 2 mm. of platinum equivalent. It is my opinion that the latter method is the one giving the best clinical results but not enough patients were treated in this manner to justify more than a personal opinion.

Every new patient entering the clinic with a diagnosis of cancer of the cervix had a biopsy regardless of the extent of the lesion. Of 114 cases studied, 102 patients were inoperable. About 25 per cent were placed in clinical Group IV (Schmitz classification). During the two and one-half years that this study was in progress, about 250 new patients with cancer of the cervix were seen and treated but only those are now being considered who were treated by x-ray and radium, and in whom it was possible to continue the investigation by microscopic study after the radium therapy. About 135 patients treated are not included in this report, because they either had a radical operation, or they did not report back to the clinic at the proper time after they had been treated with radium.

PROCEDURE

After examination and biopsy each new patient was sent to the x-ray department for a course of treatment. Each patient received a dose of between 700 r. and 1,500 r. Larger doses were not given because the great number of patients being treated in this institution taxed the machine to capacity. There were no marked skin disturbances in any case. The patients withstood the effects of the deep therapy very well. Occasionally it was difficult to convince the patients that radium therapy was necessary, for their symptoms had disappeared after the x-ray treatment. Clinically the result of deep therapy was a marked diminution in the size of the lesion, and a marked decrease in the secondary infection usually present in advanced cancer of the cervix. About three weeks after the deep therapy was completed the radium was applied. Another biopsy was taken at this time. It was noted at the time of the radium application that there was much less bleeding on manipulation than in patients who did not receive deep therapy. After being discharged from the hospital, the patients were instructed to return for observation at two- to three-week intervals. When six weeks had elapsed another biopsy was made. This last biopsy was of considerable value in deciding the future treatment of the patient. Those patients in whom cancer could be demonstrated microscopically were immediately reradiated by either emanations, radium, or additional deep therapy. It was not uncommon to find cancer microscopically in the cervix of patients who were apparently locally free of the disease by the ordinary methods of examination. By reason of early reradiation we feel that certain patients are now living and clinically free of cancer that would have gone undiscovered and untreated for some time had not these routine biopsies been made. Other patients had local healing in spite of their far-advanced condition. In the beginning of this study it was felt that x-ray and radium should cause local healing in every case, but we have found that certain types of cancer are so radio-resistant that it is impossible to cause a disappearance of the cancer microscopically regardless of the amount of radiation used. We were unable to determine in advance which grade or type of cancer microscopically would not respond to radiation therapy.

By taking biopsies for microscopic studies at definite intervals during the treatment, we noted a difference in the healing process with the use of different filters

different stages in the menstrual cycle. It is a simple and almost painless office procedure that obviates the need for curettage under anesthesia and gives satisfactory specimens.

A survey of our material consisting of over 600 specimens from cases of functional menstrual disorders reveals that there are basically only four types of endometrium: proliferative, transitional, secretory, and menstrual. The normal endometrium goes through the complete ovulatory cycle. The transitional endometrium reflects the changes during ovulation and represents the transformation from the proliferative to the secretory phase. Failure of ovulation results in the persistence of the proliferative phase. If the action of the follicular

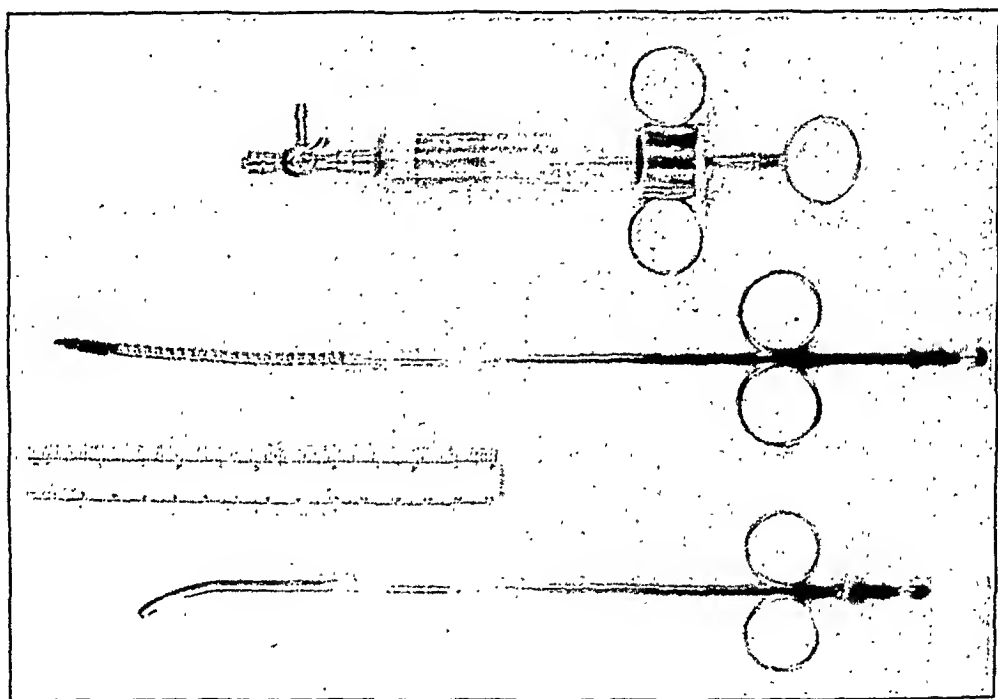


Fig. 1.—Modified suction curettes for the removal of endometrial biopsies. (A.) As modified by Kurziok. The end of the cannula has a moderately sharp edge. It is moved along the surface of the endometrium and suction is exerted by means of the syringe. A specimen is removed from each of the uterine walls. (B.) As modified by Cassidy. The end of the cannula is flexible, and it is inserted through the cervix by rotating the cannula counter-clockwise until the fundus is reached. It is then removed slowly from the uterine cavity by rotating clockwise and, at the same time, suction is exerted. (C.) Syringe with automatic lock and two-way valve.

hormone is prolonged and unopposed by progestin, cystic and glandular hyperplasia of the endometrium results. The latter is thus only an exaggerated form of a proliferative endometrium. The cycle of events may be summarized as follows:

1. Anovulatory Cycle: proliferative endometrium → cystic and glandular hyperplasia.
2. Ovulatory Cycle:
 - a. proliferative endometrium (pre-ovulation) →
 - b. transitional endometrium (co-ovulation) →
 - c. secretory endometrium (postovulation).

and the relatively few Grade IV cancers, a comparison will be made between the cancers of the other two groups, namely Grades II and III.

From Table I it is seen that 105 of the 114 cases fall into histologic Grades II and III, the cases being almost evenly divided between these two grades. It is of interest to note that the percentage of primary local cure is approximately the same in cancers of these two grades in the same clinical group. This at least suggests that the clinical extent of the tumor is of more importance in estimating the probable local cure than is the histologic grade. The response to radiation in the two his-

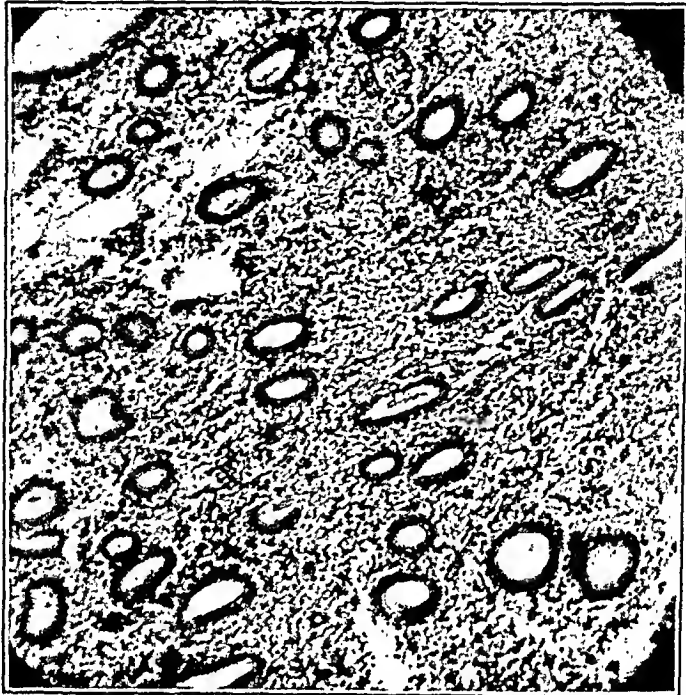
TABLE I

HISTOLOGIC GRADE	CLINICAL GROUP	CASES	PRIMARY LOCAL CURE	NO LOCAL CURE	LOCAL CURE BY RERADIATION
Adeno-carcinoma Grade II	Group I	0	0		
	Group II	0	0		
	Group III	2	2		
	Group IV	1	1		
Squamous cell carcinoma Grade II	Group I	1	0	1	1
	Group II	2	2		
	Group III	37	22	15	5
	Group IV	9	4	5	1
Squamous cell carcinoma Grade III	Group I	1	1		
	Group II	6	6		
	Group III	34	20	14	9
	Group IV	15	6	9	1
Squamous cell carcinoma Grade IV	Group I	1	0	1	1
	Group II	1	1		
	Group III*	4	2	2	1
	Group IV	0	0		

tologic grades being considered appears to be the same, thereby apparently disproving, at least in these cases, any marked difference in radiosensitivity in cancers of the same clinical extent with different microscopic characteristics. Clinically there are a larger percentage of far-advanced cases in the Grade III class than in the Grade II. This is possibly due to the fact that the more undifferentiated tumor grows faster than the more differentiated one. Of these 114 cases, 67 or 59 per cent showed primary local healing with no cancer demonstrable microscopically after a course of deep therapy and a full course of radium. Of the remaining 47 patients in whom cancer was present microscopically after treatment, 33 were reradiated almost at once. Of these reradiated cases, 19 patients showed local healing. The remaining 14 cases that did not undergo primary local healing were not reradiated either because the patient refused further treatment or her condition did not warrant additional radiation.

Another very interesting result of this study is the result of various amounts of radium on the local cancer. The cases treated with a primary dose of 4,500 mg. hours or less of radium were arbitrarily divided

years. Regular first six months only; periods then became totally irregular, alternating between amenorrhea and profuse bleeding. For the past ten years the bleeding has been almost constant though not always profuse. The patient presents marked



A.



B.

Fig. 2.—Case 1. H. N. Anovulatory bleeding, proliferative endometrium. (A.) The previous two periods have occurred after a four-week interval. No premenstrual phase. Proliferative phase present during cyclical bleeding, hence no corpus luteum formation. Biopsy taken two days before a twelve-day flow. (B.) Biopsy taken while patient was bleeding after an eight-week interval. Cystic dilatation of the glands is explained on the basis of prolonged and unopposed follicular hormone activity.

SUMMARY

1. One hundred fourteen patients with cancer of the cervix treated with a small course of roentgen ray therapy and varying amounts of radium radiation were studied clinically and histologically over a period of two and one-half years.

2. Eighty-six of the 114 patients treated showed local healing. In spite of extremely large doses of radium, it was impossible to cause local disappearance of cancer in fourteen cases.

3. Almost 50 per cent of patients treated with less than 4,500 mg. hours of radium radiation had local recurrences, whereas there were only 14 per cent recurrences in those patients treated with more than this amount.

4. Additional radiation after failure of the primary radiation to cause local healing is of great value as nineteen of thirty three patients treated in this manner had local cures following reradiation.

5. The roentgen ray therapy given prior to the radium application causes a marked retrogression of the tumor, decreases the amount of secondary infection present, and makes the operation of applying the radium easier.

6. Radium should be filtered with at least 1 mm. of platinum or 24 karat gold when used intra-cervically, and 2 mm. platinum when used as a surface application in the vagina. This prevents a complete endarteritis and hard fibrosis which in turn prevent healing. It also lessens the danger of fistula formation.

7. There appear to be no marked differences in the response to radium of the cancers of the various histologic grades studied so that histologic grading appears to be of little value in the radiation treatment of cancer of the cervix, although the grade of tumor may influence one in favor of surgery in very early cases. There appears to be no logic in the latter. The clinical extent of the disease is of far greater importance in determining the method of treatment and for prognosis.

8. Roentgen ray treatments in large amounts given over a long period of time should be effective in the parametrial extensions of the disease.

9. Larger doses of radium with heavier filtration apparently cause a greater permanency of the local cure.

637 REPUBLIC BUILDING

DISCUSSION

DR. LLOYD O. HOFFMAN, OMAHA, NEB.—The vital importance of heavier filtration has not been recognized in this country until the last few years. Many of our American gynecologists are still content with 1 mm. brass filter, which allows more beta than gamma rays to reach the surface tissues, giving excessive exudation and sloughing with subsequent endarteritis and fibrosis. At the University of Nebraska four years ago, 0.5 mm. of platinum was being used. Two years ago screenage was increased to 1.0 mm. platinum equivalent by the use of 2.0 mm. of

Thus again the improvement in the bleeding cannot be attributed to luteinization. The patient is now receiving synthetic progestin to ascertain whether the hyperplastic endometrium can be converted into a secretory type.

CASE 5.—*Ovulation Bleeding—Transitional Endometrium.*—M. S., aged twenty-six, "menstruated" every two weeks during the past year, previously once in four



A.



B.

Fig. 4.—Case 3. C. P. *Cystic and glandular hyperplasia of the endometrium. Treatment with prephusin.* (A.) The histologic picture during active bleeding (typical "swiss cheese" type). (B.) Persistence of the same morphologic characteristics during a two-month period of amenorrhea. Note complete absence of premenstrual phase.

weeks. Each profuse period is followed with considerable regularity by a scanty flow. Dysmenorrhea occurs only with the profuse period. Biopsy on the twenty-fourth day of the cycle revealed a secretory endometrium (Fig. 5, A). The ovula-

DR. AUER (closing).—There seems to be no logical reason to expect better results by using a heavier filter, for it has been shown that 2 mm. of platinum will absorb all of the beta rays and a small amount of the gamma rays. Increasing the density of the filter beyond this point only decreases the amount of available radiation.

Last year Dr. Taussig described the removal of the iliac lymph nodes following full doses of x-ray and radium. We believe that this procedure is not a radical procedure because in about 46 per cent of all patients so treated cancer was demonstrated in the glands removed at operation.

Radical operation for the cure of carcinoma of the cervix has a definite place in our armamentarium. Our operative results in early cancer are better than the results following radiation. There has been too great a swing to the side of radiation in most clinics. In our work we have found that about 20 per cent of all patients treated with radium will not respond to this form of treatment. Included in this 20 per cent are cases of Grade IV carcinoma, which are supposedly extremely radiosensitive.

The reason that we took the biopsies at six weeks was that in no patients in whom carcinoma was demonstrated at that time was there a spontaneous disappearance of the cancer in the cervix at a later date.

TECHNIC OF SUCCESSFUL REMOVAL OF THE SEPTUM OF UTERUS SEPTUS AND SUBSEQUENT DELIVERIES AT TERM*

RALPH LUIKART, M.D., OMAHA, NEB.

UTERINE abnormalities in general are thought of and treated as curiosities. Before conception the pathologic significance in most instances is slight. Dysmenorrhea and occasionally difficulty in coitus may be the only symptoms. The purpose of this communication is to describe a technic which is both simple and safe, whereby one type of abnormality of the uterus, in which there is a tendency toward habitual miscarriage and to hemorrhage in pregnancy and labor, can be made to carry a pregnancy to viability. I also wish to report two patients so treated with favorable results.

Every imaginable variation of the uterus may be found; varieties may range all the way from a slight increase in duplication to two distinct uteri with separate appendages and two vaginas, or complete absence. Most of these conditions have been discovered on the operating table, or at autopsy. Anomalies of the fetus are not uncommon products of conception of the abnormal uterus.

Bainbridge¹ states that double uterus is found in about 14 per cent of congenital uterine deformities. The double uterus seems to favor conception. Bainbridge reports Debierre's² observation of a woman who bore one child on July 17, 1870, and another October 31 of the same year, both at full term.

*Read at the Seventh Annual Meeting of the Central Association of Obstetricians and Gynecologists, held at Omaha, Neb., October 10 to 12, 1935.

menstrual period and the scanty flow the ovulation bleeding. It will also be seen that the ovulation bleeding did not occur on the same dates on two successive months.

CASE 6.—Maturity Bleeding—Secretory Endometrium.—B. B., aged twenty-eight. Hyper- and polymenorrhea past seven months. Menses previously regular since onset at fifteen years. Biopsy on the second day of a ten-day period revealed a well-developed secretory endometrium (Fig. 7). Biopsy on the fourth day of the following period (eight days' duration) showed the presence of an early proliferative endometrium. The regeneration of the endometrium, thus, appears to take place despite the continuation of the bleeding. Under pregnancy urine extract therapy (600 R.U. per week) there has been a gradual return to a normal cycle with a more moderate flow of five days' duration.

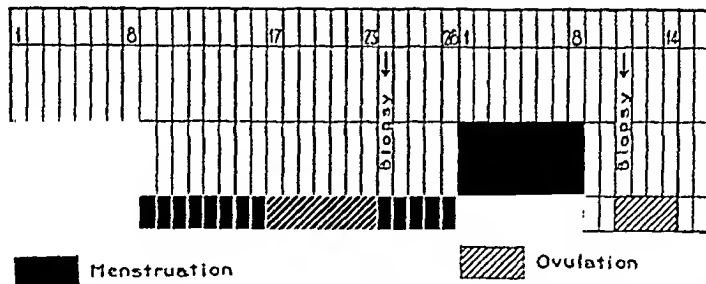


Fig. 6.—Case 5. *Ovulation bleeding.* Graph illustrating temporal and quantitative relationship between menstruation and ovulation bleeding. Note that ovulation did not occur at the same time on two successive months.



Fig. 7.—Case 6. B. B. *Maturity bleeding; secretory endometrium.* Biopsy on the second day of a ten-day menstrual flow. Prolonged and profuse bleeding from a secretory endometrium.

CASE 7.—Secondary Amenorrhea—Bleeding from a Proliferative Endometrium.—M. S., aged thirty, amenorrhea six months' duration, menses previously regular since onset at fourteen years. No atrophy of genital organs or breasts. Biopsy taken three days before the onset of a flow described by the patient as a typical menstrual period, revealed a proliferative endometrium of slight activity ("resting endometrium") (Fig. 8).

CASE 8.—Secondary Amenorrhea—Cystic and Glandular Hyperplasia.—C. G., aged twenty-six, onset of menses at ten years, regular until seven years ago when oligomenorrhea and obesity developed. No period for seven months. Married nine

not difficult to determine what surgical procedure, if any, may be helpful, and because of this much better results should be obtained. The accompanying lipiodol x-ray and diagram help visualize the difficulties which may be met if an attempt is made to remove a septum from a uterus not recently pregnant (Fig. 1). The septum is almost as thick as the uterine wall. If an attempt were made to remove it as it appears here there would be considerable difficulty and danger of doing much damage to the uterus. Because of the danger involved in removal of this thick septum the procedure in the two cases reported here was decided upon.

CASE 1.—Mrs. K. was first examined at my office in February, 1923. She was then four months pregnant. A vaginal examination revealed two vaginas and two cervices. The pregnancy was in the right side. At twenty-four weeks she miscarried. The vaginal septum only was removed at that time. During the early part of this pregnancy there was hyperemesis. There was no bleeding during pregnancy, or hemorrhage at time of the delivery.

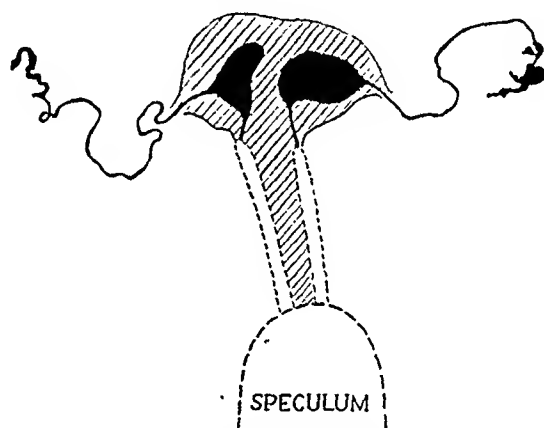


Fig. 1.—Diagram of a lipiodol injection showing a uterus septus. (From Davis *Obstetrics and Gynecology*.)

Two years later there was a second conception. At the sixteenth week the patient developed an acute appendicitis. At that time an appendectomy was done and the uterus sufficiently exposed to see that the fundus was almost normal in shape. The left tubal attachment appeared lower than the right. Below the attachment of the left tube the uterus bulged out and as a result was asymmetrical. The fundus had no separation and the uterus appeared to be about sixteen weeks pregnant. The pregnancy was now on the right side, as shown in Fig. 2. The recovery from the appendectomy was uneventful. Again at the sixth month she miscarried. Immediately after delivery of the placenta and membranes, an intrauterine examination revealed a complete separation of the uterus into two parts. The left side would admit the gloved hand, the right admitted two fingers. The right cavity as well as the os was much smaller.

Having learned that there was no depression of the fundus at the time of the appendectomy, the following procedure was carried out. Two curved stomach clamps were introduced into the cavity of the uterus, one grasping the septum posteriorly, the other anteriorly, so as to conform to the curvature of the inside of the uterine walls (Fig. 3). The septum was removed almost completely with scissors. The

metabolic rate minus 4 per cent. Biopsy revealed a secretory endometrium (Fig. 10). Scanty periods resulted from the administration of large doses of progynon-B but bleeding stopped after discontinuation of treatment.



Fig. 10.—Case 9. S. M. *Secondary amenorrhea. Secretory endometrium.* Biopsy taken during amenorrhea reveals secretory endometrium. At other "periods" has very faint staining lasting several hours, from a premenstrual endometrium.



Fig. 11.—Case 10. W. U. *Secondary amenorrhea (x-ray castration). Experimental production of cystic and glandular hyperplasia of the endometrium.* 700,000 R. U. of progynon-B given.

elamps were left in place twenty-four hours to control hemorrhage. Stomach elamps give satisfactory hemostasis but do not devitalize the tissue; therefore the chances of sepsis should be less than when a crushing clamp is used.

Convalescence was uneventful.

One year later pregnancy again occurred. The uterus seemed symmetrical throughout the pregnancy. Parturition took place at term. The baby lived. The con-

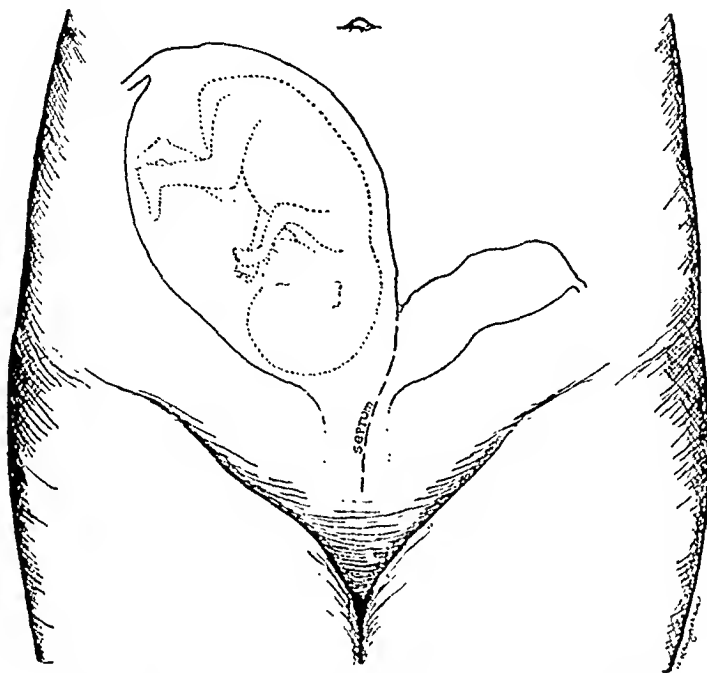


Fig. 4.—Diagram of pregnant bicornate uterus septus.



Fig. 5.—Lipiodol x-ray of bicornate uterus six weeks after removal of septum.

valescence was uneventful. Pregnancy and parturition at term again took place two years later. The baby lived. Both babies are normal.

CASE 2.—Mrs. D., aged twenty-six, history of previous illness negative, except for three vaginal operations, which evidently were for removal of a vaginal septum. She aborted eight years ago at the tenth week. Five years ago (Aug. 19, 1930) she had a miscarriage at about the eighteenth week. There was slight uterine bleeding most of the last month. The pregnancy was in the right horn (Fig. 4). At

C. *The Ovarian Factor*.—It has been repeatedly demonstrated that uterine bleeding can be artificially produced in monkeys and women by the administration of follicular hormone. According to Allen (1927), menstrual bleeding is due to a drop in the blood level of follicular hormone. There are, however, the following objections to this view:

1. In cases of primary or secondary amenorrhea, bleeding has occurred while the patients were receiving large doses of follicular hormone *without interruption* (Werner and Collier; 1933; Kurzrok, Wilson and Cassidy, 1935).

2. In cases of functional uterine bleeding, the administration of large doses of follicular hormone not only failed to stop the bleeding but actually made it more profuse. On the basis of the withdrawal theory the maintenance of a high concentration of estrin should have prevented bleeding.

Smith, Engle, and Sheleenyak (1935) have shown that in monkeys, bleeding from a secretory endometrium can be inhibited by progestin but not by follicular hormone. They believe that menstrual bleeding is due to a waning supply of corpus luteum hormone. This explanation, however, cannot be applied to anovulatory bleeding because a corpus luteum is not formed.

D. *The Anterior Pituitary Factor*.—The work of Hartman, Firor, and Geiling (1930), however, has demonstrated that there can be no bleeding without the pituitary. Working with immature monkeys, they showed that the bleeding which follows the injection of estrin does not occur in the hypophysectomized monkey. But the injection of anterior pituitary extracts into such hypophysectomized monkeys brings about bleeding from a proliferative endometrium. From this they concluded that bleeding per se is due to a special nongonadotropic hormone in the anterior lobe of the hypophysis.

We believe that the evidence at present available points to the correctness of this concept, and we offer the following *hypothesis* of a *bleeding mechanism* as a single explanation of all functional or hormonal forms of uterine bleeding (normal and abnormal):

1. Bleeding per se is due to a special hormone elaborated by the anterior lobe of the hypophysis.

2. The bleeding hormone is separate and distinct from the follicle-stimulating and luteinizing hormones.

3. It is not gonadotropic but acts directly on the endometrium.

4. Its production is stimulated by the follicular hormone.

5. Its activity is inhibited but not destroyed by progestin.

6. The actual onset of bleeding occurs when a certain concentration of bleeding hormone has been reached, providing its action is not inhibited by corpus luteum hormone.

DR. E. LEE DORSETT, St. Louis, Mo.—I feel that these conditions are somewhat more common than we expect. I have had six such cases, two of which were diagnosed as fibroids before operation. We found a double uterus when we operated. The third one had a fibroid in one of the horns. Two patients were pregnant and required cesarean section after prolonged labors, due to the fact that there was a double cervix and one cervix interfered with the dilatation of the other. The sixth case was found only upon postpartum examination. The patient came in in advanced second stage and was delivered by an interne. On postpartum examination at discharge they found a septum with a double uterus. The patient delivered perfectly normally.

In regard to the bleeding during pregnancy, I think we can explain that as due to the fact that one horn has a decidua present and the bleeding comes from that, on the same principle that we get delayed bleeding time.

DR. SAMUEL F. ABRAMS, St. Louis, Mo.—My experience is limited to three cases of double uterus. All three patients had been delivered of babies spontaneously. One woman had a breech delivery and on checking up later I found she had a septum and a double uterus. The other patients I sent to the clinic. One patient had had three normal deliveries when we found this double uterus and septum. The third patient came into the hospital bleeding and the resident curetted her with a diagnosis of an incomplete abortion. After he began his curettage he discovered a submucous myoma but did not find the septum. I found a vaginal septum with one nulliparous cervix and one multiparous cervix. This woman had had three pregnancies, apparently all in the same uterus. We did a vaginal hysterectomy, and there were submucous myomas in each uterus, each the size of a walnut. She had no history of difficulty in labor.

DR. LUIKART (closing).—The discussion has brought out very clearly that in a double uterus it is not unusual for pregnancy to go to term and deliver oftentimes without great difficulty, and occasionally, as has been said, the condition has not been recognized. With a septate uterus where the fundus is comparatively normal and there is not much notching, the situation is quite different because as stated in my report, the other half of the uterus is not available for expansion of the uterine cavity.

PREMATURE SEPARATION OF THE PLACENTA AND CIRCULATORY COLLAPSE ASSOCIATED WITH PERICARDIAL EFFUSION*

HARRY EVANS HARVEY, M.D., M.Sc.(Med.), F.A.C.S., LINCOLN, NEB.

PREMATURE separation of the placenta has been more commonly regarded as due to systemic disturbance than to mechanical factors. The following case is considered worthy of record because of the unusual sequence of events terminating in the death of the patient, and because of the light which it throws on increased venous pressure as one causal factor in premature detachment of the placenta.

Mrs. R. L., aged sixteen years, para i, was first seen when admitted to St. Elizabeth's Hospital on March 8, 1934, in the thirty-sixth week of pregnancy. The complaint was sudden vaginal bleeding accompanied only by a dull aching abdominal pain beginning about two hours before admission.

The prenatal period had been normal except for recent shortness of breath on exertion. About four weeks before, on her only prenatal examination at the city

*Read at the Seventh Annual Meeting of the Central Association of Obstetricians and Gynecologists, held at Omaha, Neb., October 10 to 12, 1935.

different matter. This may also explain the cases of patients in whom menstrual bleeding never occurs, but who become pregnant and then deliver, and also those patients in whom pregnancy occurs while the patient is temporarily amenorrheic. This implies ovulation without menstruation.

2. *Excessive inhibition of bleeding hormone* (corpus luteum cyst): The removal of a corpus luteum cyst, or a functioning corpus luteum, is soon followed by bleeding because the inhibitor of the bleeding factor has been removed.

3. *Absence of endometrium*: In order that bleeding occur it is essential to have an adequate bleeding surface. Repeated curettage within a short period of time may cause the loss of sufficient endometrium, both in the basal and functional layers, to prevent bleeding. The suction curette is of real assistance in the diagnosis.

E. *Pregnancy*.—At the onset of pregnancy, bleeding is prevented by the inhibitory effect of progestin. The corpus luteum of pregnancy continues to function much longer than it does in the menstrual cycle. Beginning at the time of nidation and continuing throughout pregnancy large quantities of prolan A and B are produced by the placenta and excreted in the urine (positive Aschheim-Zondek Test). Judging by the effect of these hormones (pregnancy urine extract) in cases of functional uterine bleeding, it appears likely that their chief function in pregnancy is to prevent bleeding by inhibition of the bleeding hormone; this, in spite of the large quantities of estrin which are simultaneously produced. One is tempted to speculate that some hemorrhages during pregnancy may be due to a quantitative disproportion between estrin which tends to stimulate formation of the bleeding hormone and prolan A and B which tends to inhibit it.

Menstruation is thus seen to be a complex process which depends for its normal occurrence upon the proper coordination of a mechanism consisting of:

1. The *anterior hypophysis*, which contributes the gonadotropic and bleeding hormones;
2. The *ovary*, which provides follicular hormone and progestin; and
3. The *endometrium* which supplies the actual bleeding surface.

It must be remembered that the other endocrine glands may influence this mechanism probably by way of the anterior lobe of the hypophysis.

TREATMENT OF FUNCTIONAL UTERINE BLEEDING

Excessive functional bleeding may be controlled in any of the following ways:

1. *Removal of the Bleeding Surface*.—*Curettage* affords only a temporary control of the bleeding. In preclimacteric cases it should be employed routinely as a diagnostic measure in order to definitely exclude malignancy. In puberty bleeding, curettage should be limited because it is usually unnecessary and often produces an unpleasant

patient must have had hypertension." Löhlein,⁵ in 1918, compared the swelling and increase of the capillary epithelium and thickening of the capillary walls in eclampsia with the picture of glomerulonephritis although he distinctly did not identify them as the same lesion. Baird and Dunn⁶ found the glomeruli in eclampsia "notably bloodless," noted that "leucocytes were conspicuously few," commented that in 9 of 10 cases of eclampsia the "constant and predominant lesions were found to be in the glomeruli and to correspond closely with those described by Löhlein, Fahr and Bell," and concluded that the "common lesion in the kidneys in fatal eclampsia is glomerular and is characterized by thickening of the capillary walls and of endothelium leading to some degree of obstruction to blood flow."

At this point one might call attention to the association of artificially induced renal ischemia and arterial hypertension as shown experimentally by the recent work of Goldblatt, et al.⁷ and its confirmation by Page.⁸ The possible application of these findings to the mechanism of hypertension in certain pregnancy toxemias is at least suggestive.

Heynemann⁹ collected 7 cases which came to necropsy from two to twenty-four years after an eclamptic pregnancy. One of these had been reported by Schultz¹⁰ in 1933 with the comment that the patient succumbed to uremia seven years after eclampsia in pregnancy, but that the clinical diagnosis of chronic glomerulonephritis was not borne out by necropsy. In fact, he found no evidence of inflammatory lesions in the kidneys. The pathologic diagnosis was nephrosclerosis. Six of the 7 cases tabulated by Heynemann were diagnosed pathologically as nephrosclerosis, malignant in 3. In 4 the final illness was an apoplexy. The seventh died of a pyelonephritis. Heynemann states, "In the development of malignant sclerosis and its transition stages eclampsia plays a not unimportant rôle.... If in the follow-up of women who have experienced an eclamptic pregnancy at an earlier time hypertension and albuminuria are disclosed this does not point to the presence of a chronic nephritis but to a nephrosclerosis... The majority of these patients succumb to apoplexy in the end." In the 594 cases followed by Herrick and Tillman² 80 per cent of the determinable deaths were from causes within the cardiovascularrenal field.

Cushing's findings of an invasion of the pars posterior of the pituitary in both essential hypertension and eclampsia, while speculative and not yet accepted in all quarters, may be mentioned as of interest in forming another and different link in the growing chain of evidence joining these two conditions.

As internists with a peculiarly favorable opportunity for the study of all phases of this problem including the symptoms during pregnancy, those appearing in the follow-up and the findings at necropsy, we record our experience with the group of milder toxemias which have been classified variously as nephritis, albuminuria of pregnancy, recurrent toxemia, and low reserve kidney. In discussing this group Stander states that it is a mild toxemia of the latter half of gestation and that if the patient's "blood pressure is normal until about the middle of pregnancy and then begins to rise, it is undoubtedly due to a toxemic condition directly associated with the pregnancy and is not essential hypertension." The criteria for this type may be quoted from Stander.¹¹

1. An elevated blood pressure which at the end of the puerperium has dropped to a normal level. In most instances this elevation is not marked, rarely exceeding 150 systolic and 90 diastolic.

overworked hematopoietic system and gives the endocrine apparatus an opportunity to reestablish an equilibrium and later resume normal function.

The exact mechanism by which pregnancy urine extract controls functional bleeding has not as yet been definitely established. The absence of effect on the endometrium conclusively shows that the cessation of the bleeding cannot be attributed to luteinization. We believe that pregnancy urine extract acts directly on the anterior pituitary and causes an inhibition of the bleeding hormone.

Similar, although not as effective, results were obtained by the use of anterior pituitary extracts. They contain the gonadotropic hormones. In very severe cases, anterior pituitary extract (prephysin), in daily doses of 1 c.c., may be injected *intravenously*. This usually stops the bleeding promptly but the severe reactions that occur in some patients from this intravenous administration somewhat limit its use.

Certain *adjuvants* to the treatment of functional uterine bleeding are important. The anemia resulting from prolonged or excessive bleeding demands careful attention. In the milder cases, *iron* may be given. The severe cases often require one or more *blood transfusions*. If a pregnant donor can be obtained, not only are erythrocytes and hemoglobin supplied but also the anterior pituitary-like hormones. *Oxytocics* as pituitrin and ergot are occasionally of value especially when the bleeding is associated with uterine atony. Where the uterus is firm they are of no value.

SUMMARY AND CONCLUSIONS

1. Five types of *functional bleeding* are considered, namely, puberty, maturity, preclimacteric, ovulation, cyclical or anovulatory.

2. Menstruation is discussed from the viewpoint of the myometrium, the endometrium, the ovary, and the anterior pituitary gland.

3. Selected cases of functional bleeding are presented and these show that: (a) Functional uterine bleeding is completely independent of the type of endometrium. (b) Cystic and glandular hyperplasia of the endometrium persists long after the bleeding has stopped. (c) The cause of functional bleeding must be sought for in some extra-endometrial factor.

4. A *theory* to explain both menstrual and functional bleeding based on the assumed presence of a bleeding factor (or hormone) in the anterior pituitary gland is suggested.

Acknowledgments.—We are indebted to Professors Benjamin P. Watson and Harry Aranow for constant encouragement and advice, and for placing the large material of the Sloane Hospital for Women and the Vanderbilt Clinic and the Morrisania City Hospital at our disposal. We also wish to thank Drs. Michael A. Casaldi, Charlotte H. Phillips, Hans Wiesbader and John C. Kilroe of the Sloane Hospital for Women and the Vanderbilt Clinic and Drs. William Aronson, Irving Cohen, Garrett Dalton and Jacob Taub of the Morrisania City Hospital for their kind cooperation and help. We highly appreciate the technical assistance rendered by Miss Fint Schackner and Miss Jane Smelser.

and of the diastolic above 90 mm. Hg excepting an occasional case with a transitory rise of either the systolic or of the diastolic blood pressure to 160 or 100 to 110 mm. Hg, respectively. None was included in which such exaggerated elevation of both systolic and diastolic pressure was simultaneous or occurred in the same individual. None showed more than a trace of albumin at any time in the antepartum period, and some showed none at all. Edema was seldom present, convulsions did not oc-

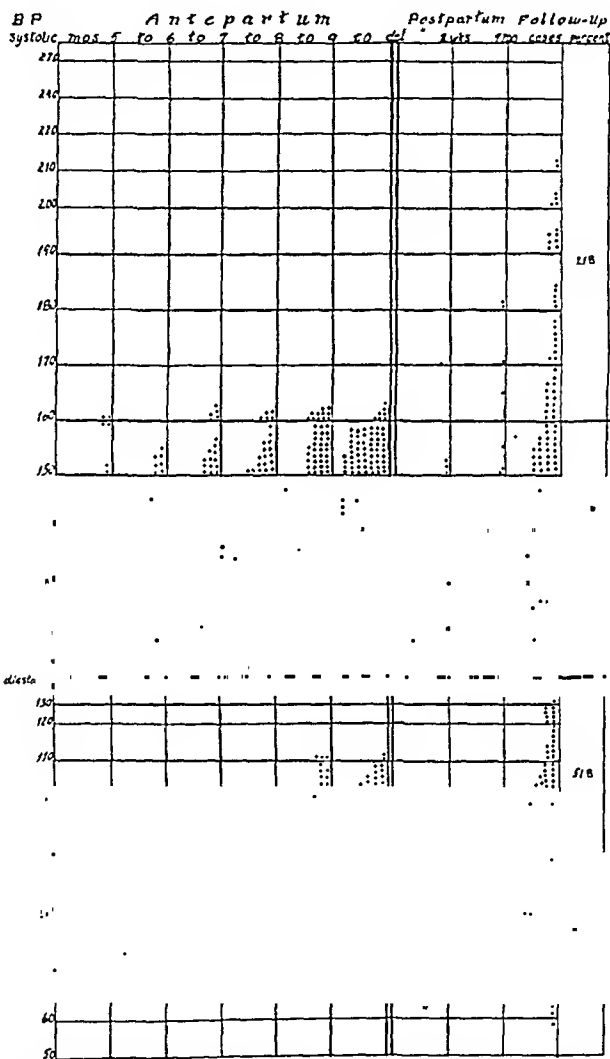


Chart 1.—Blood pressure readings in 188 cases, antepartum, during the puerperium, and at the last follow-up observation.

cur and reflex hyperexcitability or other signs of implication of the nervous system were absent. In the postpartum period practically all showed a fall of the blood pressure to normal. A comparison of the antepartum and follow-up blood pressure (systolic) is illustrated in Table I.

It is interesting to note that of the 188 cases, 63, or 33.5 per cent, showed hypertension in the follow-up, with a range from 150 to 260 mm. Hg systolic and 90 to 160 mm. Hg diastolic (Table II). It is also interesting to note that in practically all of the cases in this minor group

ripheral nerve disturbance. Stander³ advises immediate termination of pregnancy in all instances where a hemorrhagic retinitis complicates pernicious vomiting. Wagener² believes that in pernicious vomiting an optic neuritis is usually a terminal manifestation and that death will occur in spite of immediate interruption of pregnancy. He reports a case in which complete blindness occurred within thirty-six hours after the onset of the eye symptoms. This condition, with paralysis of the extraocular muscles, persisted even after termination of pregnancy, and death occurred a few days later. The following case reported here likewise ended fatally in spite of interruption of pregnancy:

CASE 1.—Mrs. C. Z., aged thirty-three, gravida ii, para i, was admitted to the Stanford Obstetrical Service of the San Francisco Hospital in the fourth month of her pregnancy. Nausea and vomiting had begun one and one-half months previously, and persisted and increased in severity up to the time of admission. Drastic treatment was instituted immediately upon entrance to the hospital. The patient, however, continued to fail, and complained of general weakness and tenderness of all her muscles. Visual disturbances developed shortly after admission. Her blood pressure was 105/70, the urine was negative except for acetone, and the CO₂ tension of the blood was 49. Eyegrounds showed slight blurring of the left disc on the temporal side, and a small fresh hemorrhage along the vein of the right. One week later vision had almost completely failed. Examination at that time showed several fresh fan-shaped hemorrhages of both retinæ, the largest appearing near the inferior retinal nerve on the left. A diagnosis of toxic neuronitis and hemorrhagic retinitis was made, and because of progressive symptoms termination of pregnancy was advised. An abdominal hysterotomy was done but the patient's symptoms persisted until vision failed completely, and death occurred three days later.

At autopsy the brain showed a moderate increase of the subarachnoid fluid, markedly congested cortical vessels, a slight shrinking of the gyri, and widening of the sulci. Microscopic examination showed multiple small hemorrhages, both old and fresh in the gray matter, especially about the third ventricle. A diagnosis was made of hyperemesis gravidarum with multiple peripheral neuritis, cerebral neuritis, hemorrhagic retinitis, unilateral hydronephrosis, and terminal bronchopneumonia.

The severity of the condition in this patient undoubtedly was not recognized until the eye findings were well advanced and a diagnosis of hemorrhagic retinitis made. Stander³ reports two similar cases. The second of these, in which the pregnancy was allowed to continue eight days following the first appearance of hemorrhages into the retinæ, was also fatal. Two of three cases recently reported by Tillman⁴ showed petechial hemorrhages and miliary focal necrosis in the brain at necropsy, similar to those found in the case presented.

BLINDNESS IN THE TOXEMIAS

According to Douglas and Griffiths,⁵ visual disturbances observed with any of the toxemias may be of either extraocular or intraocular origin. When extraocular, it may be occasioned by a retrobulbar or optic neuritis, but it more commonly manifests itself as some disturbance of the optical cortex of the occipital lobe.

According to Wagener,² the latter is the usual point of origin in the more typical types of eclamptic amaurosis. Schütz⁶ attributed the cerebral pathology to a transi-

TABLE VI

AGE	AGE AT TOXIC PREGNANCY				AGE AT FOLLOW-UP				CASES WITH B. P. BELOW 150 MM. HG IN THE FOLLOW-UP			
	MULTIPARAS		UNIPARAS		MULTIPARAS		UNIPARAS		MULTIPARAS		UNIPARAS	
	CASES	%	CASES	%	CASES	%	CASES	%	CASES	%	CASES	%
To 19	1	1.5	3	5.1	2	3.0	1	1.7	4	6.0	11	19.0
20-24	18	27.1	25	43.1	5	7.4	6	10.3	11	16.6	17	29.3
25-29	24	36.3	13	22.4	9	13.6	5	8.5	14	21.2	9	15.5
30-34	17	25.7	9	15.5	3	4.5	2	3.4	7	10.6	3	5.1
35-39	6	9.0	6	10.3	3	4.5	1	1.7	2	3.0	2	3.4
40-44			2	3.4	1	1.5			4	6.0	1	1.7
45-49									1	1.5		
50												
Not yet del.												
Total	66	99.6	58	99.8	23	34.5	15	25.6	43	64.9	43	74.0

go to term. The nearer to the end of pregnancy that amaurosis associated with toxemia occurs, the more favorable is the prognosis for complete recovery of vision. However, it is always a sign of a grave toxemia and, with few if any exceptions, immediate interruption of pregnancy is imperative.^{1, 12, 21-25}

Recurrence of a retinitis or a retinal detachment in a succeeding pregnancy is comparatively rare. Rochon-Dunigneaud²⁰ found that only 6 out of 19 patients in whom other symptoms of a toxemia reappeared, showed evidence of recurrent retinal disturbance.

Of the 7 cases of blindness reported by us, 4 are attributable to toxemia other than that accompanying pernicious vomiting. Of these, 3 occurred with an acute toxemia and 1 with the chronic nephritic type. The underlying pathology was extraocular in 2 and intraocular in 2, although one of the latter also had symptoms suggestive of cerebral involvement. Three occurred in the last month of pregnancy, and 1 at the end of the sixth month.

CASE 2.—Mrs. M. B., aged thirty-nine, gravida iv, para iii, applied for admission to the Stanford Women's Clinic during the ninth month of her pregnancy. She had had no previous medical care, and at the time of admission complained of rapidly failing vision which first manifested itself three days previously. She stated that swelling of her lower extremities had been present for about three weeks. Her blood pressure was 208/108, and her urine boiled solid. She was immediately sent to the hospital but shortly after admission vision failed completely and a severe convulsion occurred. Stronganoff treatment, with phlebotomy (500 c.c.), was instituted and an intravenous injection of 1,000 c.c. of glucose was given. Two hours later a second generalized convulsion occurred, and termination of pregnancy as an extreme emergency was considered necessary.

A classical abdominal section was performed and a full-term, living infant delivered. The patient's condition remained satisfactory throughout the procedure, and on the second postoperative day showed marked improvement, with definite return of vision. Examination of the fundi on the day following operation revealed normal discs and the absence of edema and hemorrhages, but the retinal veins were still engorged.

A diagnosis of amaurosis complicating an eclamptic toxemia was made, and the patient was dismissed on the fourteenth day of her puerperium in satisfactory condition.

CASE 3.—Mrs. C. S., gravida i, aged nineteen, entered the hospital one month before term because of a steadily rising blood pressure and albuminuria. Castor oil and quinine were given for induction of labor, without apparent result.

The following day the patient was unable to see and later was unable to answer questions. There was definite twitching of the eyelids and the right hand. Her blood pressure was 160/105, and there was an increased amount of albumin in the urine. Bag induction was advised, but because of a well thinned-out cervix already dilated to 4 cm., manual dilatation was employed, permitting version and extraction of a dead fetus. Two days after delivery the fundi were found to be normal except for one small hemorrhage in the upper temporal part of the right retina and another at the crossing of the vein with the artery in the same eye. By the fifth day postpartum vision apparently had completely returned to normal, all trace of albumin

In the hope of making a contribution, even a negative one, to a clearer conception of the mild toxemias, we have attempted to trace the ultimate fate of such patients and especially to determine the eventual presence or absence of kidney disease or other stigmas in this group of so-called low reserve kidney after prolonged follow-up.

The recognized forms of kidney disease, the nephroses, the nephritides, and those secondary to arteriosclerotic vascular changes, are based upon consistent clinical and pathologic features which need not be reviewed here. There is ample evidence to show that nephritis complicated by pregnancy is a recognizable condition with a quite definite course and prognosis. There is satisfactory evidence that eclampsia and pre-eclampsia in many of their acute manifestations and particularly in their sequelae and end-results are allied to what is variously termed hyperpiesis, essential hypertension or arteriolar nephrosclerosis. In considering the milder toxemias of pregnancy which are neither eclamptic nor nephritic in the strict sense are we dealing with an altogether new set of conditions for which we must invent new terms or can they be fitted into sound established categories?

For purposes of study of this group where theory and vague terminology abound we have selected from our 188 cases of mild toxemia those showing hypertension, not immediately postpartum, but in the follow-up period of from one and one-half to nineteen years. By the selection of those with the most pronounced functional disturbance we believe we can reach the fairest judgment as to the rôle of the kidney in the entire process from its inception in pregnancy to its end-result, including, where possible, the necropsy manifestations. Of the 63 cases comprising this group, 35 whose cooperation could be obtained were brought back for tests of renal function. The results are presented in Table X.

Certain facts emerge from a study of this kind. It would seem clear that the mild late toxemia of pregnancy with hypertension is not free from dangerous possibilities in the future. As shown in this study, about one-third will reveal systolic or diastolic hypertension or both within a year of delivery. The initial fall of blood pressure to normal during the puerperal period should not give one a sense of security. Such a fall may be followed by a significant hypertension within one to five years postpartum (Graph I). Study of this group makes one very hesitant to indict the kidney as the source of the difficulty. In a group as large as this, had an incompetent kidney been at the foundation of the disturbance, conspicuous kidney damage should have manifested itself in some of the 188 cases some time in the course of such a long follow-up period, particularly in those revealing appreciable hypertension over a period of years. Here the absent or slight albuminuria, the absence of casts or of red blood cells in the urine, the lack of anemia

ocular, as evidenced by a neuroretinitis. Rapid and complete restoration of vision occurred in the case of the fourth patient, while definite residual disturbances were found in that of the fifth, in whom there were also evidences of permanent kidney damage. These two cases substantiate the view of Stander and Peckham⁹ that the retinal edema more frequently accompanies an acute toxemia and that a neuroretinitis usually is diagnostic of a chronic nephritic type.

AMAUROSIS WITHOUT DEMONSTRABLE PATHOLOGY

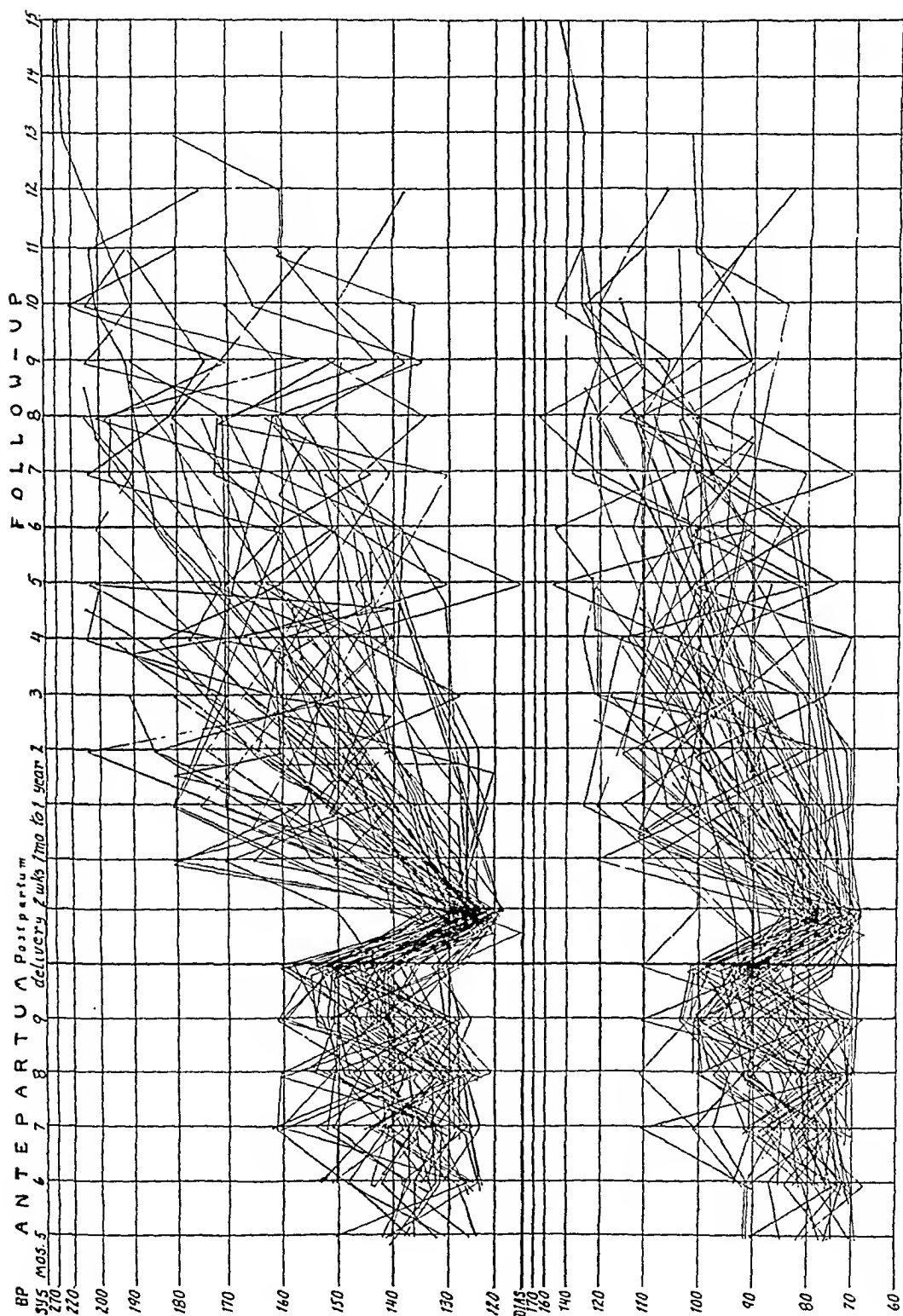
Graef²¹ and Bergmann¹ call attention to the possibility of the emotional influence of pregnancy on the functional behavior of a patient. Such reactions may range from fatigue or distress of the eyes, multiple vision, sensitivity to light, or modified fields of vision, to absolute blindness. Complete absence of any evidence of physical pathology suggests the possibility of hysteria. Both authors, however, emphasize that one must remember that the existence of a circulatory or toxic disturbance of a very low grade is readily overlooked, and that the diagnosis of hysteria requires a most rigid and unbiased investigation. Our experience with this type of case is limited to one instance.

CASE 6.—Mrs. M. H. S., aged twenty-seven, of Latin American extraction, was admitted to Lane Hospital at term for induction of labor. She had miscarried during her only previous pregnancy, and aside from an appendectomy in 1922, had a negative past history. Her blood pressure on admission was 110/65, hemoglobin 75 per cent, and urine negative. Induction of labor was decided upon because of a flat pelvis. Pains, however, began spontaneously. The patient was noted to be extremely restless during her labor, which was only partially controlled by Gwathmey analgesia. Midforceps were used following complete dilatation because of definite dystocia, and a stillborn female infant was delivered with some difficulty. Shortly after delivery the patient complained of buzzing in her head, followed the next day by inability to see. Her pupils then were dilated and did not react to light. However, both fundi were normal except for slight venous dilatation. In the absence of other findings, a diagnosis of hysteria was made. The patient recovered normally, but complained of visual difficulties when dismissed from the hospital on the fourteenth day. Three months later she was readmitted, complaining of total blindness. The eye findings remained unchanged, but because of a possibility of quinine intoxication during delivery, she was tested, and found negative to quinine hydrobromide. X-rays of the skull and sinuses were negative. This patient, unfortunately, failed to report for further observation. We were told that her mother and an aunt both had an amblyopia persisting for three months following pregnancy. On further inquiry we learned that a brother in Guatemala was furnishing financial assistance as long as she was physically incapacitated. On further neurologic investigation, a diagnosis of hysteria in a constitutional inadequate with possible frank malingering, was made.

QUININE AMAUROSIS

The seventh case in this series is of particular interest because of its relation to quinine therapy so commonly used for induction of labor. Although visual disturbances are comparatively rare following the administration of quinine, temporary and permanent impairment of vision due to its toxic effect has been recorded.

and of nitrogen retention, the benign course over a lengthy period of follow-up, are strong arguments against significant renal participation at any stage of the malady.



Graph I.—Showing the course of blood pressure in the antepartum, puerperal and follow-up periods in 63 cases. These constitute 33.5 per cent of 188 cases and are selected because of hypertension in the follow-up.

The clinician who disregards the findings of the pathologist hazards much. In terms of the necropsy the end-results of eclampsia and of

time of dismissal eleven days later her sight had improved, but even five months later the Department of Ophthalmology reported that there still existed some pallor at the temporal side of the discs with residual relative scotoma.

This case is of interest because of the comparatively small dosage of quinine used. A large majority of cases of quinine amaurosis reported have resulted from large single doses or its continued use over a varying length of time. However, an occasional patient may react to an unusually small dosage, as did this one. Gooch²⁹ reports a case in which amaurosis followed the ingestion of 60 gr. in whisky for the purpose of abortion, while Plummer³⁰ reports blindness resulting from half that amount. Gustafson³¹ and White³² report single cases of quinine reaction following its administration rectally with the Gwathmey mixture, but in neither case was there any demonstrable visual disturbance.

COMMENT

Certain conditions other than those discussed may result in visual disturbances during pregnancy. Because of their comparative infrequency they are seldom encountered, even in a large clinic service. Erdheim and Stumm,³³ Mills,³⁴ and Wheeler³⁵ noted atrophy of the optic nerve and retinal changes similar to those seen in a true toxemia, attributed to pressure by an unusually enlarged hypophysis. Severe anemia during pregnancy of the puerperium may occasionally be the cause of amaurosis. Langdon³⁶ and Fink³⁷ both report cases following extensive hemorrhage. The eye findings were essentially negative except for the lack of pupillary response and extreme pallor of the fundi. According to Langdon,³⁶ permanent loss of vision may occur because of eventual atrophy of the optic nerve unless transfusion is employed. Fuchs²² calls attention to an occasional retrobulbar neuritis with amaurosis, resulting from the lowered resistance of the patient during the puerperium.

SUMMARY

With the exception of the first case presented, which was observed in the Stanford Obstetrical Service at the San Francisco Hospital, the cases discussed comprise the total number occurring in 3,355 clinic confinements during a period of ten years in the Lane Hospital service. As a group, they prove that:

1. Amaurosis is a comparatively rare complication of pregnancy.
2. The stress and strain of pregnancy and labor, with its various physiologic and metabolic changes, may be a factor in the causation of various visual disturbances.
3. When it does occur, amaurosis is associated with some form of toxemia in the majority of cases (5 of the 7 cases presented fall in this group).
4. An amaurosis occurring at any time during pregnancy, whether associated with pernicious vomiting or one of the late toxemias, is indicative of a serious condition and demands immediate termination of pregnancy.

A single case proves little, but when it fits the picture formed by the clinical aspects of the large series it lends vigor to the argument. When one assembles the findings of a number of observers^{1-4, 9, 10} it is clear that the end-result of eclampsia and of preeclampsia is likely to be hypertensive cardiovascular disease with a terminal arteriosclerosis. So far as it goes the limited evidence here presented points to a like conclusion in examples of the milder types of toxemia.

As one reviews these studies one finds it almost impossible to reconcile the commonly accepted obstetric classification of the toxemias of pregnancy with the findings in the medical follow-up and with the necropsy results. From the clinical and pathologic observations cited, it is possible to place the eclampsias and preeclampsias in a tentative category based upon clinical and postmortem studies after follow-up. The same can be said for the true nephritides. This being granted, there remains a large group of the mild late toxemias which forms a twilight zone in which classification is vague and terminology confusing. By some these have been called nephritis, by others recurrent toxemia or low reserve kidney. In obstetric quarters there is a persistent inclination to indict the kidney as being fundamentally or solely concerned in the disturbance.

From the welter of theory and uncertainty heretofore surrounding the matter of classification of the toxemias of pregnancy ideas soundly based upon clinical and necropsy study begin to take form. When these are fully delineated it is our opinion that we shall find nephritis concerned in but a small fraction of the toxemias; that the larger number, including the eclampsias, the preeclampsias, and the variously designated milder types of late toxemia discussed in this paper will be found to have unit characters based upon cardiovascular disease with hypertension, and not upon nephritis. *Their important components are circulatory and not renal.*

If this point of view is correct it is desirable that the obstetrician gain a clear idea of the differences between these two conditions, that he cease to place so much emphasis upon the kidney, and that eventually, when further clinical and pathological studies are in hand he adopt a soundly based classification. When this desired position has been reached we believe with McCann¹² that such meaningless terms as "low reserve kidney" will be abolished. Perhaps we then shall recognize two chief types of late toxemia: one, nephritic (or rather, nephritis complicating pregnancy), based upon an antecedent or coexisting glomerulonephritis; the other, vascular, allied to or identified with hypertensive cardiovascular disease.

CONCLUSIONS

1. A satisfactory classification of the late toxemias of pregnancy will be the result of combined study by the obstetrician, the internist, and the pathologist, including symptoms during pregnancy, those appearing in the remaining years of the woman's life, and the findings at necropsy.

THE RELATION OF RETINAL CHANGES TO THE SEVERITY OF THE ACUTE TOXIC HYPERTENSIVE SYNDROME OF PREGNANCY*

ROBERT D. MUSSEY, M.D., ROCHESTER, MINN.

(From the Section on Obstetrics and Gynecology, the Mayo Clinic, and prepared in collaboration with the Section on Ophthalmology)

THE changes occurring in the retinas of women suffering from the acute toxic hypertensive syndrome of pregnancy have been noted by a number of observers. Schiötz, Cheney, Mylius, Friedenwald and others reported, in the course of toxemias of pregnancy, the identification of arteriosclerotic changes in the retina without evidence of pre-existing nephritis. Observing changes in the ocular fundus in "nephritis" of pregnancy, Behan advised study of the retinas of pregnant women. Wagener called attention to the appearance of varying degrees of spastic narrowing of the arterioles in the toxemias of the later months of pregnancy; these changes might or might not proceed to the stage of acute retinitis or to arteriosclerosis. He found that the acute vascular changes were sometimes superimposed on lesions characteristic of previous arteriosclerosis.

Before proceeding with the question of the relation of retinal changes to the degree of severity of the acute hypertensive toxemia of pregnancy, I wish to present evidence which indicates that the acute toxic hypertensive syndrome of pregnancy, commonly termed "preeclamptic toxemia," is a generalized disease affecting the arterioles and precapillary vessels throughout the body. Hinselmann, Linzemeier, Heynemann, Baer and Reis, and others noted, in preeclamptic toxemia, changes in the smaller vessels of the nail fold, consisting of alterations in the size of the arterioles, with evidence of spasm producing alternate regions of contraction and dilatation; furthermore, elongation of the capillary loops and more or less capillary stasis were seen. Hinselmann, Nettekoven and Silberbaeh found similar capillary changes in examination of a large majority of eclamptic patients. Kylin showed that these changes were identical with those in the capillaries of nonpregnant individuals suffering from acute glomerulonephritis. Keith, Barker, and Kernohan took for biopsy tissue from the pectoral muscles of nonpregnant patients who had vascular disease and glomerulonephritis; histologic studies of the walls of the arterioles disclosed changes parallel to those observed in examining the vessels of the nail fold. At or about the time of delivery in

*Submitted for publication, February 25, 1936.

IS SUPERFETATION POSSIBLE IN THE HUMAN BEING?*

WILLIAM E. STUDDIFORD, M.D., NEW YORK, N. Y.

(From the Department of Obstetrics and Gynecology, New York University Medical College, and the Obstetrical and Gynecological Service of Bellevue Hospital)

SUPERFETATION in the human being may be defined as the implantation of a second fertilized ovum in a uterus already containing a pregnancy of at least one month's duration. The belief in the occurrence of this phenomenon is of ancient origin. According to Radash¹ its possibility was discussed by Hippocrates, Pliny, and Aristotle. For a most complete review one may refer to an article by this author published in 1921. De Lee² in 1933 states that superfetation is held possible by American and French authorities but denied by the English and German.

In a survey of the literature bearing on this subject one finds several varieties of cases quoted in its support. These may be classed in the following groups: (a) Abortions in which two or more fetuses are passed with a marked difference in size and appearance; (b) cases of pregnancy which go to term and deliver two or more fetuses with a marked variation in size. In this group are also patients who deliver a term infant and following a one to three months' interval, deliver a second infant also at term; (c) cases occurring in animals.

The first group, made up of women who aborted two fetuses, obviously differing widely in size and development, has always suggested the possibility of superfetation. Tyler-Smith³ reported a case in 1856 of a woman who aborted a four to five months' fetus and about half an hour later a healthy well-formed four weeks' ovum. J. C. Longmore⁴ in 1862 reported the case of a woman who aborted a dead fetus of three to four months. This was followed by a perfect fresh ovum of four weeks. This specimen was presented before the London Obstetrical Society, was reviewed by a committee and accepted as an instance of superfetation because of the perfect condition of the smaller embryo. Gustatter⁵ in 1918 reported the simultaneous abortion of a well-formed, fresh four months' fetus and sac together with a two months' ovum. He assumed this to be a case of superfetation although no microscopic examination was carried out. He felt that this phenomenon was more frequent than was commonly believed and that it was a frequent cause of early abortion. A. W. Meyer,⁶ in 1919, reviewed four similar cases from the Mall collection and found that in all instances the smaller fetus was macerated and had been dead for some time. Strangely he does not include any microscopic reports on the placentas. He also gave further findings on the case reported by Gustatter⁵ and felt that it was of the same type. He concludes that all these cases are twin pregnancies in which one twin dies in utero followed later by a miscarriage of both living and dead fetuses. Radash¹ in 1921 reports another case, that of a woman who aborted a four months' fetus and a second fetus measuring 1.8 cm. (forty days). He gives a very complete review of the literature and concludes that this is an example of superfetation although no microscopic examinations are included in his report. He

*Presented at a meeting of the New York Obstetrical Society, November 12, 1935.

THE RELATION OF RETINAL CHANGES TO THE SEVERITY OF THE ACUTE TOXIC HYPERTENSIVE SYNDROME OF PREGNANCY*

ROBERT D. MUSSEY, M.D., ROCHESTER, MINN.

(From the Section on Obstetrics and Gynecology, the Mayo Clinic, and prepared in collaboration with the Section on Ophthalmology)

THE changes occurring in the retinas of women suffering from the acute toxic hypertensive syndrome of pregnancy have been noted by a number of observers. Schiötz, Cheney, Mylius, Friedenwald and others reported, in the course of toxemias of pregnancy, the identification of arteriosclerotic changes in the retina without evidence of pre-existing nephritis. Observing changes in the ocular fundus in "nephritis" of pregnancy, Behan advised study of the retinas of pregnant women. Wagener called attention to the appearance of varying degrees of spastic narrowing of the arterioles in the toxemias of the later months of pregnancy; these changes might or might not proceed to the stage of acute retinitis or to arteriosclerosis. He found that the acute vascular changes were sometimes superimposed on lesions characteristic of previous arteriosclerosis.

Before proceeding with the question of the relation of retinal changes to the degree of severity of the acute hypertensive toxemia of pregnancy, I wish to present evidence which indicates that the acute toxic hypertensive syndrome of pregnancy, commonly termed "preeclamptic toxemia," is a generalized disease affecting the arterioles and precapillary vessels throughout the body. Hinsehnann, Linzemeier, Heynemann, Baer and Reis, and others noted, in preeclamptic toxemia, changes in the smaller vessels of the nail fold, consisting of alterations in the size of the arterioles, with evidence of spasm producing alternate regions of contraction and dilatation; furthermore, elongation of the capillary loops and more or less capillary stasis were seen. Hinsehnann, Nettekoven and Silberbach found similar capillary changes in examination of a large majority of eclamptic patients. Kylin showed that these changes were identical with those in the capillaries of nonpregnant individuals suffering from acute glomerulonephritis. Keith, Barker, and Kernohan took for biopsy tissue from the pectoral muscles of nonpregnant patients who had vascular disease and glomerulonephritis; histologic studies of the walls of the arterioles disclosed changes parallel to those observed in examining the vessels of the nail fold. At or about the time of delivery in

*Submitted for publication, February 25, 1936.

infant. One-half hour later she delivered a second child, a small feeble premature girl. He also quotes a case reported by Fordyce Barker of a woman who delivered a term infant on July 10, 1855. On September 22, seventy-three days later, she delivered a term girl which was smaller than the other infant. This patient had a double uterus. These cases sound almost unbelievable and no such instances could be found in recent literature. This is readily understandable, since the modern obstetrician is not handicapped by the conventions of the eighteenth and early nineteenth century. At the present time if multiple pregnancy is not recognized before labor, it is certain to be discovered at the time of delivery. If delay in the birth of the second fetus takes place, steps are taken to accomplish this artificially. I know of only one case where the birth of the second twin was separated from that of the first by as much as twenty-four hours, an instance described by F. H. Holden.¹⁷ Frequently twins vary in size and development. This is conventionally ascribed to difference in fetal nutrition. However, in 1920 Schaab¹⁸ describes binovular twins weighing 1,900 and 2,850 gm. X-ray studies showed marked difference in ossification, the smaller twin showing no ossification of the epiphysis of the femur. He concludes that their development differed by at least a month. It would be of interest to make further x-ray studies in cases of twins showing a marked variation in size. Mere difference in size should be of no importance, but difference in development is of some significance.

Making up the final group are the many instances of supposed superfetation reported among the lower animals. Jepson¹⁹ in 1883 reported a cat giving birth to a term litter and at the same time a well-preserved rounded sac containing a three-fourth-inch fetus. No further examination was carried out on the small fetus. King²⁰ in 1913 reported two cases observed among 700 litters of albino rats. Both of these rats gave birth to second litters two weeks after the first. The normal duration of gestation in the albino rat is twenty to thirty days. Sumner²¹ in 1916 published his observations after a long experience in breeding mice. He states that superfetation occurs in 3 per cent of the pregnant animals. He feels that many of these cases must depend on the survival of spermatozoa for weeks. He also feels certain that ovulation must occur during pregnancy. Harmon²² in 1917 reports the accidental discovery during dissection of a possible example of superfetation in a cat. Several fetuses near term were present in the uterus, together with one very small fetus. In 1918 the same observer²³ reported a possible instance in a cow which gave birth to a term calf and a four months' fetus. Smith²⁴ in 1927 reported the case of a large black sow which gave birth to a litter of 4 and one month later to a litter of 10. Both litters appeared to be at term. He mentions instances previously reported in animals: (1) Kroen (1897) in a goat; (2) Lapken (1897) in a sow; (3) King (1913) in a cat; (4) Harman (1918) in a cow; (5) Hunt (1919) in a cat; (6) Marshall (1922) in a cat. He states that Kuntz reviewed most of these cases in 1920 and felt that they represented the retention and preservation of dead fetuses. He feels that neither his case nor that of Lapken can be explained on this basis. In a second paper in 1927 Smith²⁵ reports three instances observed in pigs and three in sheep. In one of the cases reported in the sheep he feels that the evidence is particularly strong and admits of no other explanation.

Slonaker²⁶ in 1934 made some very interesting and well-controlled observations. In breeding albino rats, he found that in the nonpregnant state these animals showed periods of activity, demonstrable by vaginal smears and mating tests, that corresponded with ovulation. During pregnancy which lasts for twenty-two days these periods are almost always absent. In a few animals periods of activity occurred twelve to fifteen days after coitus. These he feels must indicate ovulation during pregnancy. Two such animals were observed being kept with their mates until the twentieth day of pregnancy. The females were then isolated. In both instances the animals gave birth to an apparently normal litter twenty-two days

and in the retina proper. The changes in the arterioles appear first and those in the retina proper, commonly called "retinitis," are secondary to, and apparently dependent on, the changes in the arterioles. The caliber of the arterioles appears narrowed and the lumen is reduced, because of spastic contraction and increased tonus of the walls of the arterioles. This change in the arterioles may disappear entirely if there is early and permanent fall in blood pressure. The constriction soon becomes fixed if the toxemia progresses. When the constriction of any arteriole becomes so fixed and severe as to cause secondary capillary ischemia or stasis, localized edema and hemorrhage appear in the adjacent retina. If the toxemia continues, this spastic constriction may become so generalized and severe as to produce diffuse retinitis of albuminuric type, the classic "retinitis of pregnancy nephritis." The presence or absence, or the advancement, of the involvement of the arterioles can be determined best by frequent systematic examinations of the retina.

Wagener's description of the retinal changes in cases of preeclamptic toxemia may be divided into four consecutive stages, dependent on the severity and duration of the hypertension accompanying the toxemia. (1) The first visible sign is spastic narrowing of the arterioles of the retina, which may affect all branches of the central artery. (2) Often there is irregular constriction of the lumens of the arterioles, usually first or more marked in the smaller nasal branches; this constriction may vary in degree or situation from day to day. (3) Later, as the narrowing and constriction become more fixed, individual cotton-wool patches and hemorrhagic areas may appear in the retina. (4) Diffuse retinitis of albuminuric type may develop.

Ophthalmoscopic examination of the retina was made in 108 cases. 98* cases in which there were no convulsions and in 10* cases in which there were convulsions associated with the acute toxic hypertensive syndrome of pregnancy, commonly called preeclamptic toxemia and eclampsia. During hospitalization of all patients but one, the systolic blood pressure was recorded at 140 mm. of mercury or more, and urinalysis revealed albumin Grade 2 or more. In one case the highest blood pressure was less than 140 mm. systolic. Judged by the highest systolic blood pressure, the patients were classified in groups similar to those used by Peckham in his study of nephritis following acute toxemia; namely, Group 1 included patients whose systolic blood pressure was between 140 and 169 mm. of mercury; Group 2, those whose systolic blood pressure was between 170 and 199 mm., and Group 3, those whose systolic blood pressure was higher than 200 mm. There is some evidence that the diastolic blood pressure is elevated out of proportion to the systolic pressure in the more severe degrees of toxemia, but the systolic reading is more commonly quoted and is therefore used in this study.

of this fetus suggested early maceration with loss of muscle tone. The umbilical cord appeared normal and measured about 4 cm. The sex appeared to be male although this is practically impossible to determine. Section of the sac showed well-formed placental tissue lying under the amniotic membrane; this did not grossly appear to be fibrotic.



Fig. 1.—Twin A (left). Crown-rump length 3.5 cm. Grossly showed slight maceration and loss of muscle tone. Section of fetus showed complete autolysis. Amniotic sac collapsed. Placenta appeared grossly normal. Twin B (right). Delivered ten and one-half hours after Twin A. Crown-rump length 12.5 cm. Grossly in perfect condition. No sections made on fetus. Amniotic sac distended. Placenta appeared grossly normal.



Fig. 2.—Microphotograph of section of placenta of Twin A. Fibrosis of villi, degeneration of chorionic epithelium and avascularity present.

Microscopic Examination.—(Fig. 2.) Sections showed masses of decidua which in places was fairly well preserved; in other areas it showed hemorrhage and necrosis. Moderate number of polymorphonuclear leucocytes was noted throughout but in some

gest that they are visible signs of functional or angiospastic lesions rather than of arteriosclerosis. If the spastic constriction is more marked and is maintained over a significant period of time, actual organic changes are prone to occur.

A tabulation of the retinal examinations was made, also, for each rise of ten points in systolic pressure (Table II). Table II and Fig. 1 show more clearly than does Table I the progressive increase in number of patients who had the more marked changes in the arterioles and the higher systolic pressures. Four patients whose systolic blood pressure did not rise higher than 149 mm. of mercury and ten other patients who had blood pressure remaining less than 160 gave evidence of spastic constriction of the retinal arterioles. This is evidence

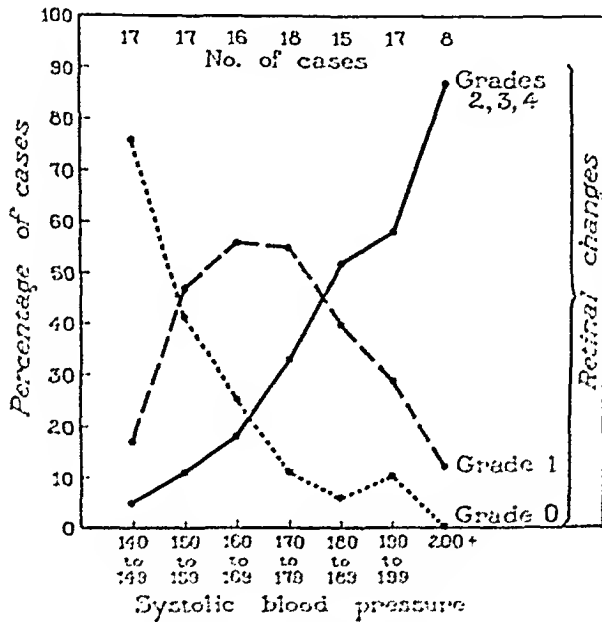


Fig. 1.—The percentage of cases arranged according to grading of retinal changes for each ten point rise in systolic blood pressure.

early regressive changes. Very little evidence was present of the double layer seen in early placental tissue. Stroma was quite cellular and contained numerous well-developed blood vessels which contained nonnucleated red blood cells. Moderate number of syncytial giant cells was noted in the intervillous spaces. Between the decidua and placenta sinuses there was a well-developed layer of fibrin and necrosis which was being invaded by many chorionic cells of the Langhans type.

Diagnosis: Normal premature placental tissue. Normal fetus (sixteen weeks).

The ages of these fetuses are approximate according to the relation of crown-rump length to age given by Williams.²⁷

Although it was first thought that this was a true example of superfetation in the human being, after careful study it was concluded from the condition of the smaller fetus and placenta that death took place some days and probably weeks before the abortion occurred. If this is a superfetation, in order for the smaller fetus to have reached the size of an eight to ten weeks' fetus followed by retention for a

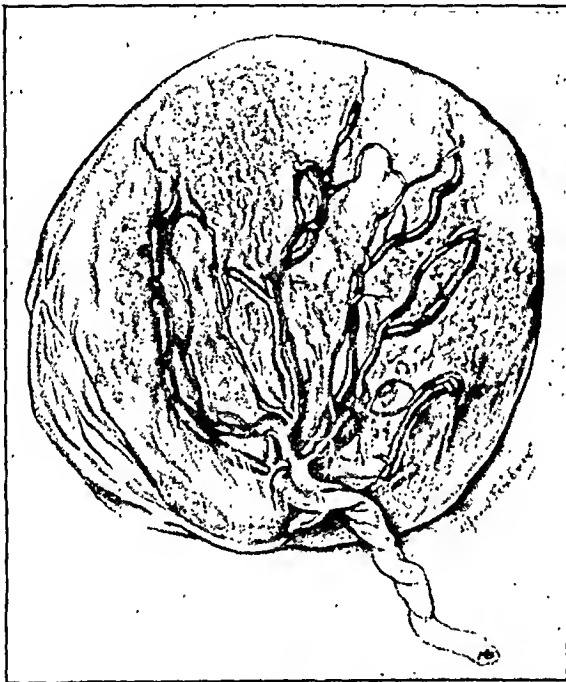


Fig. 4.—Placenta showing small rounded flattened white mass about 1 cm. in diameter situated between amnion and chorionic plate near margin at about 2 o'clock.

period of time in utero after death, the second conception must have taken place in November. According to the patient's history this is impossible. Therefore, one must decide that this specimen represents a twin pregnancy with the early death of one twin and the eventual miscarriage of both fetuses. Photographs and placental sections from this specimen were sent to Dr. George Streeter²⁸ of the Carnegie Institute of Washington. He agreed with this opinion.

CASE 2.—Mrs. L. C., white, aged twenty-seven, was first seen June 22, 1934. She had been married six months. Her menses had always been regular without pain, lasting four to five days with a thirty to thirty-two-day interval. She gave no history of skipping a period previously. Her last menses occurred on March 16, 1934. She had not felt sick in any way since this time but noted that a week previously (June 15) she had begun to have a slight pinkish vaginal discharge. On the day before her first visit this had become dark red. Physical examination revealed a uterus that was enlarged, rounded, and soft. It appeared to be about the size of a three months' gestation. The cervix was long, thick and closed. No bleeding was

the degree of change observed in the retina. This table indicates definitely that the percentage of cases in which labor was induced increased progressively with the height of the blood pressure and with the degree of change noted in the arterioles of the retinas. In a number of cases, spontaneous onset of labor rendered induction unnecessary.

TABLE III. CHANGES IN RETINAL ARTERIOLES ACCORDING TO SYSTOLIC BLOOD PRESSURE IN TEN CASES OF ECLAMPSIA WITH CONVULSIONS

CHANGES IN RETINAL ARTERIOLES, GRADE	SYSTOLIC BLOOD PRESSURE, MM. OF MERCURY						
	140 TO 149	150 TO 159	160 TO 169	170 TO 179	180 TO 189	190 TO 199	200+
4	0	0	0	0	2	0	0
3	0	0	0	1	0	0	0
2	0	0	0	1	1	0	0
1	0	1	0	0	0	1	0
0	1	0	1	0	0	1	0
Total cases	1	1	1	2	3	2	0

TABLE IV. CHANGES IN RETINAL ARTERIOLES ACCORDING TO SYSTOLIC BLOOD PRESSURE IN FORTY-SEVEN CASES IN WHICH LABOR WAS INDUCED

CHANGES IN RETINAL ARTERIOLES, GRADE	SYSTOLIC BLOOD PRESSURE, MM. OF MERCURY						
	140 TO 149	150 TO 159	160 TO 169	170 TO 179	180 TO 189	190 TO 199	200+
4	0	0	0	0	2	2	4
3	0	0	1	2	1	3	2
2	0	1	1	1	3	3	0
1	1	2	2	4	3	3	1
0	2	1	1	1	0	0	0
Percentage in each blood pressure group in which labor was induced	11.1 of 17	23.5 of 17	31.3 of 16	44.4 of 18	60 of 15	64.7 of 17	87.5 of 8

COMMENT

The acute toxic vascular syndrome of pregnancy, commonly known as preeclamptic toxemia, occurs with comparative frequency. Evidence obtained from examination of the nail folds, ocular fundi and specimens of muscle taken for biopsy, and from examination at necropsy of various organs, including the kidneys, liver, brain and heart muscle, indicates that there is widespread injury to the smaller arterioles and capillaries which may progress to permanent injury if the spastic state of the intima of these small vessels is maintained for a more or less prolonged period. Many patients who recover from the more prolonged and severe hypertensive forms of toxemia suffer permanent injury to the general vascular system or renal glomeruli, or both.

If the toxemia is either mild or, although more severe, is not prolonged, most patients improve promptly after termination of preg-

extensive decidua vera for at least two months following the beginning of pregnancy. The factor on which this phenomenon rests, therefore, would seem to be the occurrence of ovulation during pregnancy.

There has long existed a strong conviction that ovulation was inhibited during pregnancy. The basis for this opinion was not discovered but, presumably, it was founded on the inactive appearance of the follicular system other than the corpus luteum during pregnancy. Certain observations are repeatedly quoted to show that in spite of this strong opinion occasionally ovulation does take place.

Christopher³⁰ in 1886 reported an autopsy on a pregnant cat performed near term. He found in one ovary a mature follicle ready to rupture. He concluded that this follicle must have matured during pregnancy. He quotes an observation by Pouchet in 1840 who found mature follicles in different stages of development in the ovary of a pregnant sow. He also quoted a paper by Mayerhofer in 1876 reporting 6 cases of ectopic pregnancy, the ovaries showing recent corpora lutea together with well-developed ones. The writer concluded that the early corpora lutea must indicate recent ovulation. He also refers to a case reported by Slavjansky in 1877 of a woman dying of an ectopic pregnancy, one of whose ovaries showed a mature corpus luteum, a recent corpus luteum, and a mature follicle. Consentino³¹ in 1897 reported the case of a woman dying when about six months pregnant. Examination of her ovaries showed a recent corpus luteum and many follicles ranging from the primordial type to those almost mature. Rovano³² in 1907 reported the examination of 100 ovaries obtained from pregnant women. He observed ripening follicles several times and in 5 per cent of cases a recently ruptured corpus luteum. No other references could be found after a rather hasty and incomplete search. In order to obtain an idea of the appearance of the follicular system during early pregnancy the following work was undertaken. One hundred cases of ectopic pregnancy were selected in which an ovary had also been removed. At least one section from each ovary was available and in many instances several. Examination of these ovarian sections showed primordial follicle in the majority, and frequently follicular cysts. The granulose cells lining these cysts were often small, deep staining, and to a greater or lesser degree showed desquamation into the cyst cavity. Many cysts showed partial collapse. In sixteen instances a maturing follicle was present, but in only one case did the ovum and its surrounding granulose cells appear well preserved and healthy. The chorionic villi in this case were mere shadows with no cellular structure. This completely functionless tissue could have no influence on the ovary. In the remaining cases the maturing follicle showed varying stages of disintegration. Degenerating ova, collapsing spaces, small deep staining, desquamating granulose cells were present in all. No recent corpora lutea were found. In no instance was more than one corpus luteum present. One can conclude from these findings that maturation of the ovum takes place during human pregnancy, but that this terminates in degenerative changes and atresia. No evidence could be found to suggest that ovulation actually takes place. This is in agreement with the work of Evans and Swezy³³ in their studies on ovagenesis and the normal follicular cycle. They studied the ovaries during pregnancy in the rat, guinea pig, dog, cat, and monkey. They noted series of ova developing only to end in atresia. In the rat they could find no evidence of ovulation. This point is not mentioned in the case of the other animals. It is necessary to conclude that, while maturation of the ovum takes place during pregnancy, this process ends in atresia and ovulation does not take place. The early observations which have been quoted may well represent misinterpretations. This cannot be proved without reviewing these sections which, naturally, have not been available.

- 449, 1920. (13) *Hinselmann, Hans*: Zentralbl. f. d. ges. Gynäk. u. Geburtsh. 44: 987, 1920. (14) *Hinselmann, Hans, Nettekoven, Hans, and Silberbach, Walter*: Arch. f. Gynäk. 116: 443, 1923. Abst. in: J. A. M. A. 80: 1108, 1923. (15) *Keith, N. M., Barker, N. W., and Kernohan, J. W.*: Abst. in: Tr. Assn. Am. Phys. 46: 66, 1931. (16) *Kylin, Eskil*: Acta gynecol. Scandinav. 2: 501, 1924. (17) *Linzemeier, G.*: Zentralbl. f. d. ges. Gynäk. u. Geburtsh. 46: 1010, 1922. (18) *Lubarsch, O.*: Die Nierengewächse. In: Henke, F., and Lubarsch, O.: Handbuch der speziellen pathologischen Anatomie und Histologie, Berlin, 1925, Julius Springer 6: Part 1, pp. 581-717. (19) *Masters, R. J.*: Tr. Am. Ophth. Soc. 31: 416, 1933. (20) *Mylius, Karl*: Funktionelle Veränderungen am Gefäßsystem der Netzhaut, Berlin, 1928, S. Karger, 82 pp. (21) *Peckham, C. H.*: Bull. Johns Hopkins Hosp. 45: 176, 1929. (22) *Schiötz, Hjalmar*: Klin. Monatsbl. f. Augenh. 67: 1, 1921 (Suppl.). (23) *Schwarz, O. H., and Dorsett, E. L.*: South. M. J. 23: 288, 1930. (24) *Volhard, F.*: Die doppelseitigen hematogenen Nierenerkrankungen. In: von Bergmann, Gustav und Staehelin, R.: Handbuch der inneren Medizin, Berlin, 1931, Julius Springer, ed. 2, 6: Part 1, p. 333, Zentralbl. f. d. ges. Ophth. u. Grenzgeb. 21: 129, 1929. (25) *Wagener, H. P.*: J. A. M. A. 101: 1380, 1933.

FURTHER END-RESULTS IN THE TREATMENT OF CARCINOMA OF THE CERVIX*

INCLUDING THE REPORT OF A SECOND FIVE-YEAR SERIES

LEWIS C. SCHEFFEY, M.D., AND WILLIAM J. THUDIUM, M.D.,
PHILADELPHIA, PA.

(From the Department of Gynecology and the Tumor Clinic, Jefferson
Medical College Hospital)

FIVE years ago the authors published the end-results obtained in the treatment of carcinoma of the uterine cervix observed on the Gynecologic Ward Service of Dr. Brooke M. Anspach, Jefferson Medical College Hospital.¹ The group studied at that time consisted of 63 patients seen between Sept. 1, 1921, and Sept. 1, 1925, of whom 57 received treatment, 4 by combined surgery and radiation and 53 by radiation alone.

Considering 3 untraced patients as dead (a complete follow-up of 95.2 per cent), the absolute curability (based on the number seen) was 14.2 per cent, while the relative figure (based on patients actually treated) was 15.7 per cent. Considering radiation only, the absolute curability was 13.5 per cent and the relative, 15.0 per cent. Only one of the 4 patients treated by combined surgery and radiation survived the five-year period, while 8 patients treated solely by radiation were alive and well five or more years after treatment. In addition 3 patients

sumably a loss of activity of the cells producing the gonad stimulating hormone. There would seem to be some basis for suspecting that, among its many effects, this hormone, through the pituitary, depresses ovarian function and prevents ovulation during pregnancy.

CONCLUSIONS

1. No proved case of superfetation in the human being could be found in the literature.

2. A few cases were found (Longmore,⁴ Schaab¹⁸) that suggest that this phenomenon is possible.

3. In order to prove such a case certain criteria must be filled; i.e., the pregnant woman must deliver two or more fetuses of widely differing size, appearance, and development. If the smaller fetus is born dead, the condition of this fetus and placenta must be determined by microscopic examination. Only if this fetus and placenta appear normal and healthy can such a case be considered a superfetation. Should the smaller fetus survive birth, x-ray examination of the centers of ossification might prove of value.

4. The occurrence of superfetation seems most unlikely in view of the marked inhibition of ovulation which exists during pregnancy.

5. Two cases are described which superficially suggest superfetation. One is shown to be an instance of the retention of a dead twin, the other twin remaining alive. The other is a case of prolongation of pregnancy which suggests the possibility of superfetation, but which leaves no opportunity to submit this explanation to proof.

REFERENCES

- (1) Radash, H. E.: Surg. Gynec. & Obst. 32: 339, 1921. (2) De Lee, J. B.: Textbook of Obstetrics, 1933, p. 513. (3) Tyler-Smith, W.: Lancet, p. 389, April 12, 1856. (4) Longmore, J. C.: Obst. Transactions 4: 133, 1862. (5) Gustatter, A. L.: J. A. M. A. 70: 20, 1918. (6) Meyer, A. W.: J. A. M. A. 72: 769, 1919. (7) Hammond, J., and Ansell, S. A.: Brit. J. Exper. Biol. 4: 155, 1926. (8) Ingram-Johnson, R.: Brit. M. J. 2: 116, 1921. (9) Cathala, V., and Barbaro, G.: Rev. Trans. de Gynec. et d'Obstet. 20: 97, 1925. (10) Moench, G. L.: AM. J. OBST. & GYNEC. 13: 60, 1927. (11) Willis, R. A.: Med. J. Australia 1: 524, 1929. (12) Churchill, Fleetwood: On the Theory and Practice of Midwifery, 1846, p. 160. (13) Milne, Alexander: The Principles and Practice of Midwifery, 1871, p. 124. (14) Leishman, William: A System of Midwifery, 1873, p. 195. (15) Playfair, W. S.: The Science and Practice of Midwifery, 1876, p. 182. (16) Barnes, Robert and Fancourt: System of Obstetrics, Medicine and Surgery, 1884, p. 254. (17) Holden, F. H.: Personal communication. (18) Schaab, A.: Presse méd. 28: 677, 1920. (19) Jepson, S. L.: Am. J. Obst. 16: 1056, 1883. (20) King, H. D.: Biol. Bull. 24: 377, 1913. (21) Sumner, F. B.: Biol. Bull. 30: 271, 1916. (22) Harmon, M. T.: Anat. Rec. 13: 145, 1917. (23) Ibid.: Anat. Rec. 14: 335, 1918. (24) Smith, A. D. B.: J. Anat. 61: 329, 1927. (25) Ibid.: J. Anat. 62: 100, 1927. (26) Slonaker, J. R.: Am. J. Physiol. 108: 332, 1934. (27) Williams, J. Whitridge: Textbook of Obstetrics, 1927, p. 160. (28) Streeter, G. L.: Personal communication. (29) Snyder and Wislocki: Bull. Johns Hopkins Hosp. 52: 379, 1933. (30) Christopher: Am. J. Obst. 19: 457, 1886. (31) Consentino, C.: Zentralbl. f. Gynäk. 21: 933, 1897. (32) Rovano: Arch. f. Gynäk. 83: 587, 1907. (33) Evans, H. M., and Swezy, O.: Mem. of U. of C. 9: 119, 1931. (34) Snyder and Wislocki: Bull. Johns Hopkins Hosp. 49: 106, 1931. (35) Snyder, F. F.: Bull. Johns Hopkins Hosp. 54: 1, 1934. (36) Engle, E. T.: Am. J. Physiol. 106: 145, 1933. (37) Geist, S. H.: AM. J. OBST. & GYNEC. 26: 588, 1933. (38) Engle, E. T.: Personal communication.

AGE INCIDENCE, PARITY, RACE

Table III shows the age incidence of the group. Attention should be called to the fact that nearly 30 per cent of the patients were under the age of forty and that comparatively few patients over sixty years

TABLE III. AGE INCIDENCE, PARITY, RACE

DECADE	NUMBER	PER CENT
20-29	6	3.8
30-39	40	25.6
40-49	44	28.2
50-59	45	28.9
60-69	19	12.1
70-79	2	1.3
Youngest, 22; oldest, 79		
29.4 per cent under age of 40		
Nulliparas, 9, 5.7 per cent		
Negroes, 21, 13.4 per cent		

of age were observed. The youngest patient in the series was twenty-two; the oldest, seventy-nine. Nine patients were nulliparous (5.7 per cent); 21 were negroes (13.4 per cent).

RESULTS OF TREATMENT

In evaluating the results obtained in the treatment of cancer of the cervix, it has been generally accepted that a patient may be regarded as cured who is alive and free from evidence of the disease five years after treatment. That this criterion should be accepted as the standard of curability is open to criticism because:

1. There may be recurrence of the growth after the so-called five-year period has elapsed, a not infrequent observation.
2. Reradiation of recurrent carcinomatous areas may have prolonged the period of survival to five years and even longer, as noted in our experience.
3. Misunderstanding as to the employment of the term "five-year cure," in statistical reviews. Does the expression invariably refer to patients actually living and free from evidence of carcinoma for five years or longer after treatment, or does the term merely imply survival for five years or longer with death occurring from recurrent cancer at some time after such a period of salvage has elapsed?

of the ovaries has been drawn on for further control material. As one of us⁴ has shown, ovarian failure closely simulates the changes in normal function level which characterize the state of pregnancy. The composition of these several series may be presented in tabular form for later orientation.

TABLE I. COMPOSITION OF SERIES

SERIES	NO.	FEMALES PER CENT	AGE, AVERAGE
A. Pregnant, toxic	50	100	30 yr.
B. Pregnant, normal	100	100	24 yr.
C. Hypogonad	300	100	34 yr.
D. Hepatic dysfunction	100	77	38 yr.
E. Cardiorenal	50	70	46 yr.

A few additional words of explanation are apposite. The relative youth of the normal series comes from the fact that many of them were unmarried mothers drawn from institutions providing for their care. The time factor necessary for the development of functional derangements operated in the ovarian failure series and even more significantly in those with the hepatic and cardiorenal conditions. The inclusion of males in these last two series was intentional, the underlying pathology in both series offering no characteristic sexual content.

There are three primary approaches to the estimation of the levels of carbohydrate metabolism, namely, the urine, the blood, and the measurement of the tolerance or utilization capacity. This last may be approached from several standpoints, such as (a) provocative melituria, (b) blood sugar curves, and (c) changes in the respiratory metabolism as recorded by the respiratory quotient, or the specific dynamic action. The first method only of this third group has been utilized in these studies. The approach through the changing levels of blood sugar under excitation of a conventional test meal lacks a sharpness of quantitative definition and entails a series of venipunctures which rapidly cools the enthusiasm of the volunteer subject of experiment. Measurement of the respiratory exchange calls for a highly skilled technical approach, is very time-consuming, and yet again lacks at the present time those clear-cut standards of normal response which prevent differences from assuming a reasonable arithmetical precision. At some future date, when enough data have been compiled to confer clarity of outline on the standards, it seems certain that respiratory measurements will become a method of election for precise study; at present, its several disadvantages outweigh the possible gain from its use.

In the categories listed above, the first named was the urine. Under normal conditions, the twenty-four-hour urine does not contain enough reducing material to give a positive sugar test with a suitable delicate reagent such as the well-known Benedict solution. Collections made

the large group of advanced cases (Classes 3, 4, and 5), the absolute curability rate is 16.6 per cent; the five-year salvage was 19.5 per cent. The improved prognosis following treatment of the "early" case is well illustrated.

TABLE V. RESULT OF TREATMENT, CLASSES 1 AND 2

Of 18 patients observed and treated, 7 are alive from 5 to 12 years	38.8 per cent
3 additional patients survived from 6 to 8 years after treatment, establishing a 5-year salvage of	55.5 per cent

CARCINOMA OF CERVICAL STUMP

Our experience with carcinoma of the cervical stump is embodied in a contribution now in course of preparation, which will include an analysis of such cases as we have seen to date and which will deal with the various phases of this complex problem. In the group of 156 patients herewith presented, the condition was met with 7 times, an incidence of 4.5 per cent. All were well-advanced cases (Class 3). Three are alive and well, seven years after treatment (42.8 per cent). One lived six years after treatment, increasing the five-year salvage to 57.1 per cent. Three died within a year of treatment. Radium therapy was employed in each case, supplemented by x-ray radiation in three instances, one of which includes a patient now living (Table VI).

TABLE VI. CARCINOMA OF CERVICAL STUMP

Patients seen	156
Carcinoma cervical stump	7
Incidence	4.5 per cent
Present-day survival	3
Survived 6 years	1
Died within one year of treatment	3
Absolute salvage	42.8 per cent
5-year salvage	57.1 per cent

HISTOLOGIC GRADING

the lower incidence of postparturient melituria. The differences in the urine sugar in the two groups are another confirmatory evidence. The persistence of lactose even up to six months postpartum has already been recorded. The group of ovarian failures, in which condition a depressed sugar tolerance is a characteristic sign, exceeds the influence of pregnancy to an appreciable degree, and the liver cases show a parity with the first two groups. The occasional appearance of glycosuria in cardiorenal cases associated with hypertension was reported by O'Hare⁵ in 1920, and his findings confirmed more recently by several others. The underlying mechanism of this phenomenon need not concern us at this time. It should be noted, however, that lowered renal permeability may also and in opposite sense affect the passage of sugar through the kidney as well as of the several nitrogenous constituents of the blood which usually form the focus of attention in this condition.

To summarize the urine evidences in relation to our thesis, it may be said that toxic pregnancy shows no greater incidence of glycosuria during its progress than does the normal course of this physiologic state. Further, emptying of the uterus before the termination of gestation seems to influence favorably a return to the normal, at least so far as the disappearance of melituria is concerned. The postpartum lactosuria is to be regarded as a physiologic rather than pathologic manifestation and appears alike in the toxic and the normal.

How far blood sugar levels are competent to indicate disturbances in carbohydrate metabolism is a very real question. True, there are a few conditions such as diabetes and hyperpituitarism on the one hand, and adrenal failure and insulin shock on the other, that exert influences on blood sugar that the normal homeostatic agencies cannot control. On the other hand, there are a great variety of more or less morbid states in which sugar utilization is gravely disturbed and yet which give no evidence in significantly changed levels of blood sugar. Departures from the conventional norm, for this reason, assume a wholly special significance.

The averages for this quantity derived from the several series are grouped in Table III.

TABLE III. BLOOD SUGAR

GROUP	PARTUM	
	ANTE-	POST-
A. Pregnant, toxic		
I, II, III	84	90
IV	88	96
Total, average	85	92
B. Pregnant, normal	83	94
C. Hypogonad		97
D. Hepatic dysfunction		93
E. Cardiorenal		96

TABLE VIII. TREATMENT, SURGERY AND RADIATION, 6 PATIENTS

Complete hysterectomy, preceded by radiation (2 died in 1½ years; 1 survived 6 years—Recurrence radium and x-ray therapy; death 1 year later)	3
Complete hysterectomy, followed by radiation (1 alive and well; operation, 1921; recurrence, 1925; radium and x-ray therapy. 2 dead; operation elsewhere; recurrence, radiation, and death in 1 year)	3

RADIATION THERAPY

One hundred and forty patients were treated solely by radiation therapy, 114 (81.4 per cent) by radium alone. Subsequent x-ray therapy was employed in 22 (15.7 per cent), while 4 patients (2.8 per cent) received x-ray therapy only. The technique of the radium application in this group, sometimes spoken of as the concentrated treatment method, has been practically uniform throughout with the exception of the milligram hour dosage. Fifty milligrams of radium sulphate, sealed in glass within a silver capsule of 0.3 mm. thickness, enclosed in turn by a brass capsule of 1.0 mm. thickness, further screened with black rubber tubing 2.0 mm. in thickness, has generally been placed in the cervical canal or its craterlike remnant. About the periphery of the growth have been placed needles, 6 to 8 in number, containing 12.5 mg. of radium screened by 0.3 mm. of Monel metal. Particular attention has always been paid to the protection of the bladder, rectum, and uninvolved vaginal walls by the liberal use of gauze packing together with a self-retaining bladder catheter in situ (Table IX).

TABLE IX. RADIATION THERAPY, 140 PATIENTS

RADIATION	PATIENTS	PER CENT
Radium only	114	81.4
Radium plus x-ray	22	15.7
X-ray only	4	2.8
Reradiations	23	16.4
Of 20 living patients, 6 (20.7 per cent) received subsequent x-ray therapy; 3 (10.3 per cent) were also reradiated.		
Of 111 patients now dead, 16 (14.4 per cent) received subsequent x-ray therapy; 20 (18.0 per cent) were also reradiated.		

collections are freed by fermentation before final examination is made. The levulose approach is rather more elaborate in that the urines are tested by the Selivanov reagent and the fructose when found to be present is quantitated by a combination of several methods including the use of the precision polariscope. As the analytical procedures here employed as well as a number of others have been subject to extensive critical analysis, the results of which are shortly to appear, further discussion may be waived at this time.

In the series of normal pregnant women constituting the present first control group, the galactose tolerance was determined at stated intervals, usually one month, throughout the pregnancy. Likewise, after delivery, the practice was continued for as long a period as contact was maintained. These results have already been published³ but the table may be reproduced here for purposes of orientation.

TABLE IV. GALACTOSE TOLERANCE IN PREGNANCY

PERIOD	MONTH	TOLERANCE DOSE		
		20 GM.	30 GM.	40 GM.
Antepartum	3	67%	33%	0
	4	67%	33%	0
	5	63%	37%	0
	6	67%	33%	0
	7	62%	38%	0
	8	89%	11%	0
	9	100%	0	0
Delivery				
Postpartum	1*	100%	0	0
	2	73%	27%	0
	3	100%	0	0
	4	67%	33%	0
	5	25%	75%	0
	6		50%	50%
	over 6			100%

*Third and fourth weeks only.

There is a steady progressive fall of galactose tolerance toward an inferior level 50 per cent below the normal, which latter is shown by all of the cases in the series during the last month. After delivery, recovery begins in the second and is usually complete by the expiration of the sixth month. It is interesting that this recovery takes place irrespective of the lactational status of the mother.

Before discussing the results of applying this test to the several groups, it may be briefly stated that the tolerance dose, i.e., that which will produce a transitory trace of the sugar in the urine while a dose ten grams less yields only negative results, varies somewhat with the sex and with the sexual status of the individual. The present series are confined to adults, hence the normal male tolerance of 30 gm., and that of the female of 40 gm. applies to all of the members of the several groups with the exception of the pregnant, whose levels have already been recorded in Table IV. The collected data are given in the next table.

cm. square."⁴ The dosage delivered through each port varied from 800 r. to 2,140 r. Three patients received 1 course, 1 received 2 courses, and 1 reached 3 courses.

Since that time the saturation method of Pfahler has been followed. This aims to give a maximum amount of radiation to the tumor without damaging the normal structures. Treatment is directed through 4 ports, 2 anterior and 2 posterior; the size of the ports varies with the size of the patient; in small individuals, ports 16 cm. square are sufficient; in large individuals, ports 20 cm. square are employed. The patient is measured with calipers and a cross-section diagram made of the pelvis on tracing paper. The depth dose is determined by the use of the isodose curves of Weatherwax. The object is to deliver 100 per cent of the skin erythema dose into the depths of the pelvis in two weeks, by giving treatment on alternate days until the saturation level is reached. Treatment is then continued two more weeks, keeping the depth dose at 100 per cent by giving enough treatment to make up the loss sustained in the intervals between treatment.

The factors used in the treatment are 200 kilovolts, 50 cm. distance filtered through 0.5 mm. of copper and 1.0 mm. of aluminum. The output on one machine is 18.5 r. per minute when 8 milliamperes are used, and the erythema is estimated at 800 r. The dosage delivered through each port by this method varied from 1,400 to 2,500 r., the majority of the patients receiving one course of treatment, some of which has been subsequent to 1930.

Because of the use of this improved technic and because recently, as advocated by Healy,⁵ we have been preceding radium therapy more and more with preliminary x-ray treatment, and employing it more promptly after treatment with radium, we are of the opinion that the result of this altered plan of treatment will be reflected in the follow-up study of the patients treated since 1930 and will thus form an advantageous basis for a comparative study with the results obtained in the series herewith presented.

IV, the uncomplicated renal fraction, less than one-fourth of the patients depart from the normal during the antepartum study but nearly one-half show depression after the termination of gestation. Interpretation of these findings, at best, must be highly tentative in the light of our present knowledge. The liver cases of the first three subdivisions show a shift from the antepartum scatter toward a consistent depression in those cases which are abnormal. Conceivably this is a

TABLE VI. GALACTOSE TOLERANCE; ANALYSIS OF TOXEMIA GROUP

GROUP	BELOW 20	20-30	OVER 30
	1. Antepartum		
I, II, III	29%	58%	13%
IV	15%	77%	8%
	2. Postpartum		
I, II, III	41%	56%	3%
IV	45%	55%	0%

residuum of the earlier liver abnormality expressing itself consistently with a further or sustained lowered level of hepatic function. With Group IV, the residual damage is relatively greater and produces only depression.

The only warrantable general deduction to be made from these figures is that toxic pregnancy produces marked changes in the galactose metabolism. This is in striking contrast to the urine and blood reports and must be conceded to be far more consistent with the known physical status of the members of the toxic group.

Turning to the levulose metabolism, it becomes necessary as a preliminary step to define standards of the normal. Our work with this sugar is still under way and all of the indications with it lack that clarity of outline which the galactose figures possess as a result of the application of the test to nearly five thousand completely studied individuals. Recognizing that our figures at this time must be tentative and possibly subject to future revision, the best criteria now available are given in Table VII.

TABLE VII. NORMAL CONTROLS, LEVULOSE (VALUES ARE APPROXIMATE)

STADIUM	FEMALE	MALE
Prepuberal	75	100
Puberal	75-100	
Adult	100-125	

The sex difference with galactose, reported so frequently in earlier papers, does not find a certain parity when this second sugar is used. Our best figures for the adult female seemingly lie between 100 and 125 gm. for the tolerance dose; the adult male is seemingly positive with 100, although here too there may be a possible slight upward

ment that whether carcinoma of the cervix be treated by operation or by irradiation, the salvage is about 20 per cent in recognized clinics.

Our results will show no material improvement until we obtain a satisfactory method of delivering a larger amount of radiation to the parametrial tissues. At the University Hospital, we increased our radium dosage two years ago to an average of 5,000 mg. hr. and have followed this with two x-ray cycles of 1,600 r. to each of four fields.

We feel that x-ray therapy is undoubtedly of palliative value, but whether it will increase the total salvage remains to be seen. Our impression is that the results are somewhat better, although sufficient time has not elapsed for a statistical study. We doubt however the wisdom of the administration of heavy dosage of x-ray to the patient with far-advanced cancer in whom there is little or no chance of cure.

DR. BAXTER L. CRAWFORD.—In carcinoma of the cervix, the prognosis based upon the microscopic grading of the tumor alone is probably of little value. When however the grade of malignancy of the tumor is considered with other points, such as the size and duration of the lesion and the age of the patient, we consider that it is of distinct value. The degree of malignancy also seems to have a relationship to metastasis, for tumors of high malignancy are more likely to metastasize earlier than those of low malignancy.

DR. STEPHEN E. TRACY.—I do not believe in the treatment of carcinoma by a predetermined number of milligram hours of radium. At the Oncologic Hospital we treat malignancies according to tissue and constitutional tolerance. Patients with carcinoma of the cervix are treated locally with radium up to the limit of tissue tolerance. This is followed by the limit of deep x-ray treatment. The dosage varies from a few hundred to several thousand milligram hours of radium. To illustrate this point I shall cite one case:

A patient with a Group III cancer of the cervix had been given 7,400 mg. hr., of radium locally which had been followed by 11,600 r. units. The tissues healed and all evidence of the malignancy disappeared until two years later. At that time there was noted a hard mass, 5 cm., in diameter, situated in the left side of the pelvis between the rectum and the pelvic bone. As x-ray had accomplished but little in similar cases, it was decided to treat her with a 4 gm. radium bomb. Over a period of seventeen days she was given 232,000 mg. hr., of radium filtered with 0.05 platinum, 3 of lead at 15 cm. distance. Three weeks later the mass was soft and about one-third its former size. This patient was seen a few weeks ago, about a year after the treatment, and at that time the mass had entirely disappeared.

and supplementing the two pregnant series with the figures from other small groups drawn from the current levulose studies, we have the data collected in Table IX.

TABLE IX. ANALYSIS OF LEVULOSE TOLERANCE

GROUP	SUBGROUP	AVERAGE + DOSE	
A. Pregnant, toxic		A. P.	P. P.
	I	58	75
	II	59	75
	III	60	50
	IV	61	61
	Total, average	59	65
*B1. Pregnant, normal		72	73
*C1. Hypogonad			91
*D1. Hepatic dysfunction			80
Normal adult tolerance†			100-125

*Small series of 15 to 35 cases.

†Approximate value.

The toxic groups certainly show average values below those of the pregnant series. In subgroups I and II of the toxic cases, those in which a liver factor was established, there is recovery on delivery to levels on a parity with the normal postpartum figure. This, by the way, is one of the interesting lacks of correlation with galactose, already noted above. The other two do not reflect this improvement, Group IV being unchanged and Group III experiencing a still greater depression.

The ovarian cases do not show that depression with levulose that is so striking a feature of their response to galactose. They are a little low, it is true, but by no means reach the levels determined by pregnancy. Finally, the liver cases show a downward trend less marked than in the response to galactose. With the usually postulated influence of the liver on levulose metabolism, this is interesting; it remains for confirmation with a larger series for the observation to assume meaning.

The material here presented scarcely calls for formal summary as each section has been briefly interpreted in the course of the discussion.

One may say that simple blood and urine evidences fail to indicate true disturbances of carbohydrate metabolism in toxic pregnancy other than those intrinsic in the common physiologic condition. By tolerance testing, however, both with galactose and levulose, there is an unmistakable downward trend from the levels of normal pregnancy to those reported in the toxemias. The indications, however, lack a clarity of outline and definition which permits of an arithmetical expression. Certainly with levulose, less precisely as regards galactose, the trends are qualitative rather than quantitative. Superimposed disturbances of carbohydrate metabolism in the toxic group are, however, demonstrated with certainty.

removed "through the vagina." Our cases bear out in a measure the old contention that a relatively long period of sterility precedes an ectopic gestation. Two women had not been pregnant for twelve years; 1, for ten; 4, for nine; 1, for three; and 1 was a nullipara.

SYMPTOMATOLOGY

Menses.—In our cases there was not invariably a history of a missed period before the onset of the illness. Two patients missed no periods; four missed one month; one missed two months, and three patients gave no definite time for the onset of symptoms. Of these three, one became ill about six months after the last menstrual period; one was not sure of the time of onset, and one was a Mexican immigrant, unable to give an understandable history.

Pain.—This was of universal occurrence in all of our patients. It was localized twice in the right side, twice in the left, five times in the lower abdomen, once in the back, and by two patients it was localized as originating in "the womb."

Fainting or Equivalents.—Symptoms of this nature appeared only twice. One patient experienced actual fainting and the other had repeated attacks of vertigo.

Gastrointestinal.—Constipation which increased gradually from the onset of the present illness was the outstanding gastrointestinal complaint. It was present in seven of these cases. In six of them, as will be seen later, the placental attachment was on the lower sigmoid, colon or rectum, thus giving an anatomical basis for this complaint. Only two patients gave a history of nausea and vomiting during their illness.

Genitourinary.—Four cases gave symptoms of bladder irritation such as frequency, dysuria, and burning. In none of the four, however, did the site of placental attachment offer basis for the complaint. The bladder was involved in the placental site only once. In this case, where the placenta was partially attached to the vesicle peritoneum, the patient had no bladder symptoms.

Bleeding.—This occurred in six of our cases, and was usually (four cases) preceded or accompanied by cramplike pains. In one case, the pain followed

The earliest work on congenital palsies in children was done just a hundred years ago. It is usual, however, to date the recognition of this condition from about 1840, when William J. Little, an English orthopedist, described in some detail the mental and motor consequences of lesions of the brain at the time of birth. The condition has since generally been known as "Little's Disease," the most obvious symptom of which is generalized impairment of voluntary musculature.

One of the first in this country to call attention to the behavioral consequences of birth injuries in children of school age was Dr. Walter S. Cornell, Health and Medical Inspector of the Philadelphia schools, who wrote in 1912:

"Injuries of the head at time of birth . . . produce an unknown number of mental deficiencies. . . . How many of the simply dull and backward school children arise from this cause cannot be determined."

Dr. Cornell's early description of infantile cerebral paralysis produced by head injuries still provides a good description of this condition. He says: "This disease . . . presents a paralysis resulting from injury to the brain. This injury usually occurs during a difficult labor, particularly if obstetric forceps be required, but it may occur from inflammation of the brain substance or rupture of a cerebral blood vessel during the first few years of life. The cause of the latter event is usually unknown. After recovery from the first shock of fever, a permanent paralysis remains, affecting usually one side of the body and often including one side of the face. In such cases, it is equivalent to an ordinary stroke of apoplexy occurring in childhood. In other cases both sides are paralyzed, so that the whole body is affected. In a few cases both lower limbs only are paralyzed. There is no marked wasting of the paralyzed limbs, although contractures and deformities develop. The paralyzed muscles show evidence of nerve irritation, and the tendon reflexes, such as the knee jerk, are exaggerated. For the same reason the hands and face often show spasmodic movements when used for manual work or speech. Since the brain is the part actually injured, it is natural that not only paralysis but a feeble mind, may ensue, and from a practical standpoint these cases are classed as mental disease. It is therefore very important to distinguish between spinal and cerebral paralysis. In the former, intelligence is normal, the paralysis is usually only in one limb, the tendon reflexes are absent, and there is more wasting of muscles."

The immediate consequences of birth injuries are evident chiefly in the production of motor handicaps. Mental deficiency is a frequent accompaniment of these handicaps. Or mental retardation may result from birth injury, without serious motor handicaps. There is some reason to believe that disturbance of personality may also be produced by birth injury, independently of motor handicaps or mental retardation. Sensory handicaps, especially of sight and hearing, may be still other consequences involving, particularly, muscular disturbances in the visual apparatus.

The motor disturbances provide the most conspicuous symptoms in these cases. These include, particularly, spasticity and athetosis. Spasticity is defined as "simultaneous and hypertonic contractions of antagonistic muscle groups of the voluntary motor system." These muscle groups act reciprocally in such a way that, normally, as one muscle group contracts the corresponding or antagonistic group relaxes. Spasticity reflects the simultaneous rather than the reciprocal action of these

25 per cent each; fifth and sixth days, 12½ per cent each. Whenever possible, the placenta in whole or in part was removed manually, especially any detached portions, along with the fetus, if it could be found, and all of the old blood present. The mortality for this series was 20 per cent.

Our cases are reported in detail as follows:

CASE 1.—R. A., a Mexican immigrant twenty-nine years old, was admitted to the Medical service of the University Hospital on Feb. 18, 1928, because of probable obstruction of the bowel, accompanied with severe abdominal pain, nausea, and vomiting. The physician who referred her to the hospital had her under his care for an assumed normal pregnancy. She complained of progressive constipation which had increased steadily in severity since September. There had been some pain in the right lower quadrant. Vomiting and loss of weight had been marked during the few weeks preceding admission. It was impossible to obtain further details of her history because of her inability to speak or understand English or classical Spanish.

Upon examination, she was found to be well developed but poorly nourished, with moderate abdominal distention and dullness in both flanks. There was a right lower quadrant mass extending to the left of the midline and to the umbilicus. Pelvic examination revealed a large pelvic mass pushing the cervix forward and downward. There was a marked tenderness in both fornices. The patient was markedly anemic with corresponding pallor. The remainder of the physical examination was not significant. After consultation with the heads of the departments of Gynecology and Obstetrics, the patient was transferred to Gynecology. X-ray of the pelvis revealed no fetal shadow. The urine contained granular and hyaline casts with a trace of bile; a positive acetone persisted throughout her hospital stay. Her admission blood count showed 2,690,000 red cells, 16,000 white cells, and a Hg of 60. The differential count was normal. No other laboratory procedures were significant.

there also be evidence in the child that the abnormalities of delivery did actually affect him adversely. These effects are noted in the condition of the child at birth or soon thereafter, as indicated by deficient animation, convulsions, abnormal reactions of infancy, motor disturbance, intellectual apathy, and the like.

The mental and physical consequences of abnormal birth become more clear as the development of the child proceeds. Retardation in the development of motor functions and in expressive behavior during infancy tend to confirm the likelihood that the child was actually injured at birth. If there is mental retardation or disturbance of motor functions, the history should show that this may not have been due to some post-natal pathology, such as accident, disease, and the like. Heredity should also be free from suspicion. There are many conditions whose symptoms resemble those due to birth injuries and the final impression as to both symptoms and cause must be left to competent medical diagnosis.

In a careful survey at The Training School at Vineland, New Jersey, it was found that about 10 per cent of 450 mentally deficient children owed their condition to cerebral birth lesions. This condition seems, therefore, numerically second only to unfavorable heredity as a cause of mental deficiency.

At the Spalding School, Chicago, about 450 out of about 900 crippled school children are classed as "spastics." Most of these cases are probably due to cerebral birth lesions. One-third of these are rated as mentally subnormal, but this may be a rather high estimate, due to the difficulties of early mental diagnosis in such children.

Thus we may say: (1) if one person per 100 is feeble-minded, and if one-tenth of the feeble-minded are birth-injured, then one person per 1,000 is feeble-minded due to this cause; and (2) if seven children per 1,000 are crippled, and if one-half of these are spastic, and if one-third of these in turn are mentally deficient, again we would find one person per 1,000 with mental deficiency due to birth injuries. These figures are, however, only tentative.

The possibilities of education and training among children suffering from birth injuries are of special importance. First, however, the condition must be adequately diagnosed with reference to both mental and motor symptoms, and perhaps with reference to personality disorders as well.

The most promising method of treatment of the motor difficulties is muscle training administered by skilled physical therapists under the direction of a competent orthopedic surgeon. If the child is mentally retarded, it is rather likely that muscle training will prove less promising than if he is mentally normal. Adequate recognition of the mental condition is, therefore, of the utmost importance. For this purpose, it is necessary that the psychologist conducting the mental examination in

intestinal and omental adhesions. The pelvis was filled by a mass whose posterior surface felt smooth-like placental tissue. The villous attachment was to the posterior surface of the uterus, both broad ligaments, the base of the culdesae, and the mesorectum.

The entire pregnant mass was released by finger dissection. There was no placental attachment to the gut. Manual extraction of the placenta and fetus was accomplished and a right salpingectomy was performed. The drainage consisted of a culdesae gauze drain, rubber tubing into the culdesae and Penrose tubing brought out through the abdominal wound. The postoperative course was uneventful and the patient was discharged from the hospital on the thirty-third postoperative day. Communication with this patient Sept. 9, 1935, revealed that she was in good condition and has menstruated regularly without pain. There was no drainage from the abdominal wound after her release. There have been no subsequent pregnancies.

CASE 4.—M. T., a white woman, thirty-three years old, entered the hospital March 11, 1932, complaining of pain in the right side. The onset of her illness began Feb. 1, 1932, with an attack of influenza which was accompanied by a moderate cough and constipation. On February 21, she became nauseated, vomited, and experienced general abdominal pain. On March 8, there was a "sharp spasm of the womb," with sharp pains in the right lower quadrant, cold sweat, dizziness, nausea, vomiting, and syncope which lasted about ten minutes. She was confined to bed following this attack and had improved generally except for a residual soreness in both lower quadrants. There was no history of any previous pelvic infection or operation. She had had six pregnancies with two miscarriages, one of these terminating the last pregnancy at one month in 1929. There had been constipation, urgency of urination, dysuria and nocturia for the duration of the present illness. The last menstrual period was Feb. 12, 1932. Physical examination was not remarkable except for diffuse tenderness in the lower abdomen and the pelvis which revealed the cervix to be anterior, pushed downward and tender to palpation. The uterus was not palpable. There was marked tenderness in both adnexa. Urinalysis was not remarkable. Blood examination showed a Hg of 30 per cent with a red cell count of 3,020,000 and a white cell count of 7,300. The differential was normal.

Operation was decided upon with a preoperative diagnosis of ectopic pregnancy. When the abdomen was opened, a pregnancy the size of a grapefruit was found, to which the intestines and omentum were adherent. There was a large blood clot adherent to the free margin of the omentum. The lower posterior abdominal wall and posterior uterine wall formed a part of the wall enclosing this mass. Degenerative changes were evidenced by the foul odor and circulatory changes present. The abdominal pregnancy was removed and a right salpingo-oophorectomy was performed. Drainage consisted of one piece of gauze brought out through the abdominal wound and one piece of gauze brought out through the culdesae. The patient was given a blood transfusion the day after operation. The convalescence was not remarkable in any way and she was discharged on the thirty-fifth postoperative day. Subsequent examination of this patient has not been possible.

And what of prevention? P. Brooke Bland suggests a five-point program:

First, adequate prenatal care. This involves not only the hygiene and physiology of pregnancy, but also adequate forecast of the possible dangers likely to confront the expectant mother at the time of delivery.

Second, the competent management of the delivery, with a minimum of operative procedures and a maximum of patience (the "masterly inactivity" of good obstetrics), but recognizing that a properly assisted delivery may be less hazardous to both mother and child than merely letting nature take its course.

Third, immediate exercise of spinal tap in all newborn infants where there is a suggestion of possible brain hemorrhage, whether in an apparently normal spontaneous delivery or in a complicated labor.

Fourth, repetition of spinal tap, if necessary, until spinal fluid is reasonably clear of the products of hemorrhage.

Fifth, administration of maternal blood (or other suitable adult blood) to avoid further hemorrhage.

If, in spite of these precautions, damage is done, there is a reasonable hope that at least some of the effects will be overcome through the processes of growth. Early, persistent, and long-continued programs of muscle training, supplemented by judicious use of special therapy and educational methods will go far toward helping the child to attain a happy and useful, if not wholly competent, place in the world about him.

DISCUSSION

DR. P. BROOKE BLAND, PHILADELPHIA, PA.—Statistics disclose that each year, in America, 150,000 babies are stillborn or die shortly after delivery. This means, roughly, the death of one baby every three minutes throughout the 365 days of the year.

The study made by Holland, as well as by many other investigators, indicates that intracranial damage with hemorrhage is not only one of the chief causes of the lamentably high fetal mortality, being responsible for from 20 to 40 per cent of stillbirths and neonatal deaths, but likewise in many instances for tragic and disabling sequelae of the cerebrospinal system.

A study of the problem in our own clinic discloses that in 5,442 consecutive births there were 258 deaths (a fetal mortality of 4.75 per cent). Of these deaths, 36, or 10.08 per cent, were due to intracranial injury with hemorrhage.

There are, I realize, two schools deeply interested in the problem, one claiming that intracranial injuries do, and the other that injuries of this character do not, result in destructive changes in the brain and spinal cord. To me, the latter assumption seems unwarranted.

In adults, hemorrhage about the Rolandic fissure, for example, is always followed by disabling sequelae both early and late. These resemble strikingly the complications arising from intracranial damage of the newborn child. In the adult, injury of the vital contents within the cranium, especially when accompanied by an outpouring of blood, is always followed by degenerative changes in the brain. Is it not logical to assume that similar changes should take place in the newborn child?

CASE 7.—A. D., a white woman, thirty-two years old, entered the hospital Aug. 29, 1933, complaining of lower abdominal cramps. She dated the onset of her illness as June 4, 1933, when she suffered a cramplike pain in the lower abdomen and passed a large clot of blood per vaginam. This was immediately followed by vomiting, chills, and an increase in temperature. Since that time she had had repeated, intermittent, sharp pains in the uterine region, referred to the labia. There had been some dyspnea after such an attack the week before admission. She had been confined to bed since the beginning of her illness. Nocturia was the only genitourinary symptom. There had been three full-term pregnancies, the last in 1924. There was no history of previous pelvic infection or operation. The last menstrual period was April 2, 1933.

The pertinent physical findings were: tenderness in the left lower quadrant on direct palpation and referred pain from pressure on the opposite side; tenderness in the right costovertebral wall. The uterus was palpable through the abdominal wall. Pelvic examination showed deep stellate lacerations of the cervix. The uterus was the size of a grapefruit, regular in contour, anterior in position, and fixed. Both adnexa were tender and fixed, with bulging in both lateral fornices. The laboratory findings were negative except for a marked secondary anemia. The red cell count was 2,370,000 with a Hg of 48 per cent, and a corresponding rapid sedimentation rate. A diagnosis of secondary abdominal pregnancy was made.

At operation, a diagnostic needling of the culdesac revealed old blood. The pelvis and lower abdomen contained an abdominal pregnancy which was located posterior to the uterus. The placenta was attached to the posterior surface of the right broad ligament, to the right lateral posterior margin of the uterus, and to the cecum, omentum and several loops of small intestine. Notation was made of the possibility of penetration of the small intestine by chorionic villi. The abdominal pregnancy was removed as completely as was compatible with safety. There was very little active bleeding. Pelvic gauze brought out through the lower angle of the incision afforded drainage. The patient received a blood transfusion immediately after operation and another on the fourth day. Her remaining convalescence was uneventful, and she was discharged sixteen days after operation. When she was examined April 10, 1934, pelvic examination was negative.

CASE 8.—M. T., a white woman, thirty-one years old, was admitted to the hospital on Sept. 23, 1933, complaining of pain in the left side and vaginal bleeding off and on for eight weeks. On July 23, just two months before admission, this pain had lasted unusually long and was followed by profuse bleeding. This experience had recurred since, always accompanied by dizziness. There had been some constipation, dysuria, and nocturia ever since the July attack. Low backache had also been rather constant. The attacks of pain were described as steady and sharp. She had had one pregnancy with full-term delivery in 1929, and no history of previous pelvic infection or operation. The last menstrual period was July 9, 1933.

A few words about the type of material comprising these cases. More than half of the cases are private, delivered for the most part by men doing general practice. The rest are clinic patients, the great majority of whom have had prenatal care. These clinic patients usually come from the vicinity of the Hospital and are from a class of people, on the whole, somewhat higher from the financial and other aspects, than those patients attending clinics in large municipal institutions. The frequency of syphilis as a cause of neonatal mortality is, in this group, quite low. Clinic patients with positive Wassermanns are referred elsewhere. The number of patients referred from the outside lies probably somewhat between that of the municipal institutions, which are to some extent "dumping grounds," and that of strictly lying-in hospitals, practically all of whose cases come from their own indoor or outdoor clinics. Colored patients are a negligible factor in this analysis. No attempt will be made to list the deaths according as to whether they were stillborn or lived any length of time, as it is felt that a much better classification is afforded in a different manner. It is, for example, from the standpoint of etiology, a matter of little importance in a case where a child died of cerebral hemorrhage, whether the hemorrhage was produced before it was born so that a stillborn child resulted, or whether the baby managed to survive two hours or two days after the trauma.

The analysis includes those patients delivered at St. Elizabeth's Hospital, Brighton, Massachusetts, from 1927 to 1934 inclusive. During this time there were 6,149 children, and there were, including those that were not viable, 428 deaths, triplets occurring twice and twins in ten instances, a fetal mortality then of 6.9 per cent. There were, however, 23 nonviable babies, and if we subtract this group it gives a corrected mortality of 6.6 per cent.

The causes of deaths are listed in the order of their frequency of occurrence, and taken up in detail.

1. a. Chronic nephritis, 40	}	86	20.1%
b. Toxemia of pregnancy, 30			
c. Separated placenta, 16			
2. Cerebral hemorrhage		66	15.4%
Definite, 54			
Probable, 12			
3. Monstrosities		42	9.8%
4. Prematurity		37	8.4%
5. Asphyxia		32	7.47%
6. Infection of newborn		26	6%
7. Nonviable		23	5.6%
8. Placenta previa		15	3.5%
9. Hemorrhagic disease of the newborn		9	2.1%
10. Rupture of the uterus		4	0.9%
11. Congenital heart disease		4	0.9%
12. Thymus (possible)		3	0.7%
13. Atelectasis		2	0.4%
14. Miscellaneous		4	0.9%
15. Cause of death obscure		75	17.5%

three fingerbreadths of the umbilicus on both sides. This mass was neither movable nor tender. Pelvic examination showed that the cervix was posterior in position and pushed downward; it was of increased size and contained a transverse laceration. The uterus was increased to four times normal size and was not distinctly palpable from the tumor mass. This mass was irregular in shape, partly fixed, and filled the pelvis. The adnexa were tender. Laboratory examination was not remarkable except for a moderate secondary anemia and a slightly rapid sedimentation time. The Friedman test for pregnancy was negative. No definite pre-operative diagnosis was made, but an exploratory laparotomy was decided upon.

The operative findings were: The cervix was enlarged, and the uterine cavity was three to four inches in length. There was a left lateral pelvic mass fast to the hollow of the ilium extending to the crest of the ilium. It was slightly movable and had pushed the uterus to the right. It appeared to be a secondary abdominal pregnancy, the sac of which was intact with dilated veins on the anterior surface. The contents of the sac were macerated and consisted of a semidegenerated fetus and placenta. The placenta was attached to the posterior surface of the left broad ligament, to the left lateral pelvic wall, and to the lateral margin of the mesentery of the rectum and lower sigmoid. Finger dissection and separation of the placenta were accomplished without hemorrhage. The sac was packed with gauze. Suture ligation of the dilated veins was performed. One piece of abdominal gauze was inserted outside the sac and both pieces of gauze, plus one piece of Penrose tubing, were brought out through the lower angle of the abdominal incision. The postoperative course was uneventful except for an unaccountable chill on the fifth postoperative day and a sudden rise in temperature to 104° F. six days later.

The patient was discharged twenty-three days after operation. A report from this patient on Aug. 21, 1935, stated that she felt well and had gained weight. The abdominal wound had drained slightly for two months after her release. Her menstrual periods had been regular and painless.

SUMMARY

Ten cases of secondary abdominal pregnancy have been studied as a basis for this discussion. While recognizing the possibility of primary abdominal pregnancy, we are of the opinion that its occurrence must be exceedingly rare. The incidence of secondary abdominal pregnancy in our series, reported here, is 0.28 per cent. A relatively long period of sterility preceding the ectopic gestation was a common factor in this series. Pelvic infection, on the other hand, did not seem to play a noticeable part in predisposing the patients to the development of secondary abdominal pregnancy. Although at times a history of disturbed menses was suggestive of ectopic pregnancy, we do not find that it was a guide in diagnosing secondary abdominal pregnancy.

of the disaster. Most of the children were of the anencephalic type, oftentimes with spina bifida and club feet. Hydrocephalus occurred a few times, microcephalus once, and there was one cyclops, and one symphus apus or congenital lack of the extremities. Nearly all of these, of course, were stillborn, a few living for a short while. There were no autopsies.

4. *Prematurity*.—There were thirty-seven cases. Prematurity was then the cause of the loss of 8.4 per cent of the babies. Definite factors were responsible for one-third of these premature deliveries. Twins accounted for ten cases, triplets for two, and one was a case of ovarian cyst which was operated. In the rest there is no factor which was obvious, except for the fact that in three cases there were previous histories showing a tendency to spontaneous premature labor. Many of these cases were terminated by low forceps, a fact about which some comment will be made later. Of these premature deliveries two were delivered by cesarean section without preliminary x-rays. One of these had had a previous repair of an old tear, and the second had a deformed pelvis from infantile paralysis.

5. *Asphyxia*.—There were thirty-two cases (7.47 per cent). (a) Fifteen of these were cases of prolapsed cord, all but one being stillborn. Of these fifteen cases, placenta previa was the cause of malpresentation in two instances, and in two other cases, the shoulder was the presenting part and the cause of the prolapse. One of the cases was referred from the outside. It is not obvious from a perusal of these cases how the prolapse of the cord could have been prevented. One child lived seven hours and autopsy revealed marked hemorrhage of the adrenal gland, a common autopsy finding. (b) There were five cases in which difficulty in delivery of the shoulder was the cause of death. These patients were all delivered by house officers, and they were all very large babies, one baby weighing 14 pounds, 4 ounces. Autopsy was performed on one of these babies and revealed complete atelectasis. (c) In two cases the cause of asphyxia was knotting of the cord. (d) There were five cases in which labor was prolonged, the child dying during the labor before any attempts at delivery. One of these cases was autopsied and revealed marked edema of the pia arachnoid. (e) In one case the cord was coiled tightly twice around the neck, evidently shutting off the blood supply, with resultant intrauterine death. (f) There were two cases quite interesting, where cerebral hemorrhage resulted evidently during labor, before rupture of the membranes occurred. In both of these cases the progress of labor was normal. The fetal heart sounds were regular, but following rupture of the membranes at full dilatation, a great deal of meconium came away and deliveries were promptly and easily performed by low forceps. One of these was autopsied. It lived several hours with pallid asphyxia and an autopsy revealed one large cerebral hemorrhage. The other child was not autopsied but had several convulsions and the case was clearly one of cerebral hemorrhage. They have been classified under the heading of asphyxia however, because the fundamental explanation seemed to be interference with circulation in the cord, which was wound around the neck. The case autopsied was a personal case and a careful review of all the factors seems to leave no explanation but that of cerebral hemorrhage resulting from intrauterine asphyxia due to shutting off of the circulation in the umbilical cord. (g) There was one case of breech delivery where the cord was extremely tight between the legs, and it was felt that this was the cause of asphyxia. (h) Another child was delivered covered with foul mucoid material and the physician was unable to clear the air passages of this. The origin of the mucoid material is obscure. The child lived three-quarters of an hour. The diagnosis was atelectasis. Autopsy was performed in four cases in this group. Adrenal hemorrhage occurred in one, cerebral hemorrhage in another, marked edema of the pia in the third, and in the fourth where a house officer had delay in extraction of the shoulders, atelectasis.

THE IMMEDIATE AND THE REMOTE EFFECT OF ABDOMINAL CESAREAN SECTION*

THADDEUS L. MONTGOMERY, M.D., PHILADELPHIA, PA.

(From the Department of Obstetrics, Jefferson Medical College Hospital)

THE complete story of abdominal cesarean section can be told only when one has studied the remote as well as the immediate effects of the operation. Statistics which deal with mortality register a mere fraction of the whole, for submortal cases, instances which fall only slightly short of fatal outcome, and lesser lesions, which at the time appear minor in nature, but may later cause difficulty, are left untouched. No estimate of the efficacy or degree of safety of cesarean section can be made without considering the end-results as well as the immediate morbidity and maternal fatality.

With these thoughts in mind a review of all the cesarean sections performed in a ward service of ten years' extent has been undertaken. Consideration has been given to ultimate results as well as to immediate outcome. The findings serve further to convince the author that cesarean section, in its many potentialities for danger, occupies an unparalleled position among abdominal operations.

From September, 1925 to September, 1935, 229 abdominal cesarean sections were performed in a charity service of 13,733 deliveries, a percentage of incidence of 1.6 per cent (Table I). Of the 229 patients operated upon, 57 (25 per cent) were previously unregistered and unattended in prenatal care, and 98 (43 per cent) were colored (Table IV). While these two factors had apparently little influence on the ultimate rate of morbidity and mortality, yet they present some idea of the social status of the patients treated.

this class. In some the difficulty in ascertaining the cause of the stillbirth was due to the incompleteness of the record, but in the majority the patients had a normal pregnancy, a previous normal history, and where subsequent pregnancies followed, normal deliveries later. Moreover they had normal blood pressures, and had no signs of toxemia or nephritis. The presence of this large unclassified group indicates the necessity for autopsies in all stillborn and neonatal deaths. In two instances repeat cesarean sections were performed without previous roentgenograms. In both the babies were macerated.

COMMENT

It is obvious that in certain of these groups that there can be, with our present knowledge, no reduction of infant mortality. There are however some types where a reduction is possible.

1. *Infection*.—There are three sources of contamination of infants. One is uncontrollable. This concerns visitors to patients in the hospital, and under present hospital rules it is an important one. The controllable factors are the contacts of nurses and doctors with the infants. If the following simple rules are carried out, the possibility of infection from these two sources will be at a minimum. New nurses coming on duty should have a careful examination of hands, nose and throat, and a culture of the throat. Those showing positive *Streptococcus hemolyticus* cultures should not be allowed to handle infants, as also, of course, those who show evidence of chronic, subacute, or acute infection of the nose or throat. It should be emphasized to the nurses that they must immediately report head colds, sore throats, and infected fingers to the nurse in charge, and the infected nurse must immediately be taken off duty. Doctors should reduce examinations of newborn infants to a minimum, and when examinations are made should wear a sterile gown, be capped and masked, and should be furnished with a stethoscope from the nursery, and not allowed to use their own. Moreover the hands should be scrubbed and then rinsed in antiseptic solutions before a baby is examined. All these are important, particularly in a general hospital where men doing general work are taking care of infants. A doctor who comes from a scarlet fever case is a great menace to newborn babies unless he takes definite precautions. There should, if possible, be two nurseries alternately used, scrubbed and aired, and of course, the appearance of any discharge from the nose or eye, or skin lesion should call for immediate quarantine of that baby, and removal from the obstetric department.

2. *Cerebral Hemorrhage*.—No one who has done any amount of obstetrics feels that cerebral hemorrhage can be reduced to the vanishing point. A percentage around 12 or 15 per cent would seem high. Certainly if it could be brought home to the profession at large that consultation with the obstetrician, particularly in the case of a primipara, or one with a history of previous difficult deliveries, should be held before labor starts and not after labor has been well under way, or after futile attempts at delivery have been made, then the results would be better both for the baby and the mother. In any primipara when the head is not well engaged a few weeks before term, the use of roentgenograms will result in the saving of many more babies and the prevention of some cripples. Some of the convulsive cases in this series may have been tetanoid.

3. *Hemorrhagic Disease of the Newborn*.—The routine injection in the newborn of an ounce of blood under the skin at the time of delivery, is a simple procedure. Excellent results have been reported and it seems logical.

4. *Prematurity*.—In many cases of prematurity in this series, forceps deliveries were performed or breech extraction, and occasionally version and extraction. It cannot be too strongly emphasized that whenever possible a delivery should be normal. The performance of a generous episiotomy in a primipara who is in premature labor

has been agreed upon, the temperature chart method, unreliable though it is, has generally been accepted as a criterion. In the department at Jefferson any temperature, regardless of cause, which reaches 100.4° on any two days of the puerperium, not including the first twenty-four hours after delivery, is considered a manifestation of morbidity. Upon this basis 148 of the 229 operations of this series were followed by puerperal morbidity, a rate of 64.6 per cent (Table III). In this group are included also the fatalities which developed such temperature reaction.

TABLE III. PUERPERAL MORBIDITY

148 in 229 = 64.6%

Definition: Any temperature, regardless of cause, which reaches 100.4° on any two days during the puerperal period, not including the first 24 hours after delivery.

CAUSES	
"Reaction" from operation (True cause not detected)	48 = 16.6%
Infection abdominal incision	31 = 13.5%
Local uterine inflammation (Puerperal endometritis and metritis)	21 = 9.0%
Pneumonia	7 = 3.0%
Bronchitis	7 = 3.0%
Widespread septic infection	5 = 2.1%
Pyelocystitis	5 = 2.1%
Parametritis	4
Femoral and broad ligament phlebitis	4
Pelvic peritonitis	3
Pelvic abscess	2
Postoperative pulmonary collapse	2
Toxic psychosis	1
Meningitis	1
Tuberculosis	1
Ischiorectal abscess	1
Mastitis	1

"Reaction from operation," a sort of dumping ground for all cases in which no definite cause for morbidity could be detected, is given credit for 48 morbid temperatures (16 per cent of all operations). While this term seems inadequate, yet at present I know of none better to describe the phenomenon of temperature elevation without detectable cause. Possibly due to some protein reaction incident to the trauma of the cesarean birth, it is manifested in almost all patients; less noticeably in operations under local or gas anesthesia, and somewhat less frequently in clean, well-controlled private patients than in charity ward patients.

Infection of the abdominal incision accounted for, or was associated with, 31 cases of morbidity (13.5 per cent of all operations), a frequency of occurrence much greater than is encountered in other forms of lower abdominal surgery (of which more will be said later in connection with remote sequelae of the operation). A tender uterus and disturbed lochial discharge, taken as evidences of local uterine inflammation (puerperal metritis and endometritis), were found 21 times. Bronchial and pul-

It is quite evident from the literature and also from the hospital records of some patients operated upon during pregnancy, chiefly by general surgeons, that the pregnancy was not diagnosed or at least not recorded. Hence, we believe that the incidence of surgery done in pregnancy is greater than statistics in general seem to indicate.

It is our impression from this study, although we have no comparable statistics to prove the point, that surgical complications of certain types, viz., traumatic surgery, occur less frequently during pregnancy than in the nonpregnant woman. The explanation of this difference may be due to the exercise of caution on the part of the patient and to her prenatal attention.

Though pregnancy may add to the gravity of the complication, nevertheless the clinical findings of an emergency make the picture primarily surgical. Better surgical technique, improvement in anesthetics and in methods of giving them, with proper preoperative and postoperative consideration of the existing pregnancy, have removed many former actual risks to mother and fetus.

This report includes a survey of the surgical complications occurring in 9,767 consecutive patients with uterine pregnancies admitted to the Obstetrical Service of the Presbyterian Hospital and to the Outpatient Department of Rush Medical College of the University of Chicago. I am reporting only those patients operated upon and disregarding those presenting surgical complications not demanding surgical intervention. The latter group is included in the preceding report by Dr. Edward Allen and Dr. Carl P. Bauer dealing with the medical complications of pregnancy in this same gross group of patients.

Of the 9,767 patients studied, 72 were operated upon. No attempt has been made to include dental surgery, removal of infected teeth or other foci of infection, or other minor surgical procedures not later discussed. The service as a group has felt for years that these conditions, particularly foci of infection, play a greater rôle than is ordinarily supposed. This is borne out by our analysis of the medical complications of pregnancy. We have now instituted a method by which these so-called minor complications may be more accurately evaluated, and we hope to report the results at a future date.

Table I lists the complications and number of operations performed in these various surgical procedures. The complications are listed in the order of their frequency.

In Table II we have divided the fibromyoma uteri into four groups with respect to the gestation period and the type of operative procedure performed.

The first group includes those patients operated upon by myomectomy and the pregnancy allowed to progress.

In the second group treatment was postponed and myomectomy done at the time of delivery by cesarean section at or near term. It is of

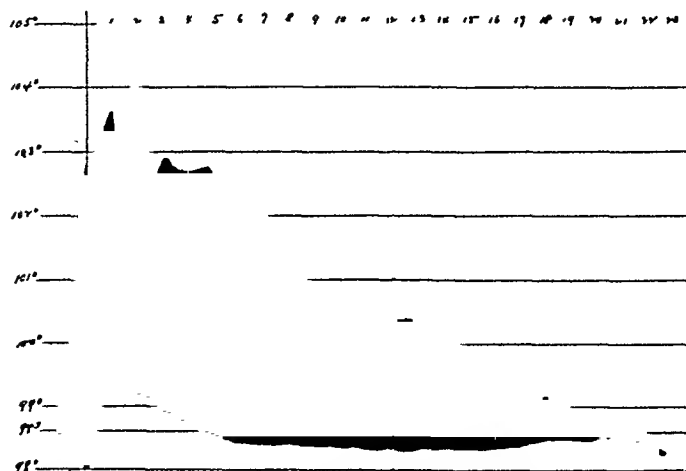


Fig. 1.—Temperature zone in all cesarean sections. Maternal mortality, 14 in 229, 6.1 per cent; puerperal morbidity, 148 in 229, 64.6 per cent; average number of postoperative hospital days, 18.

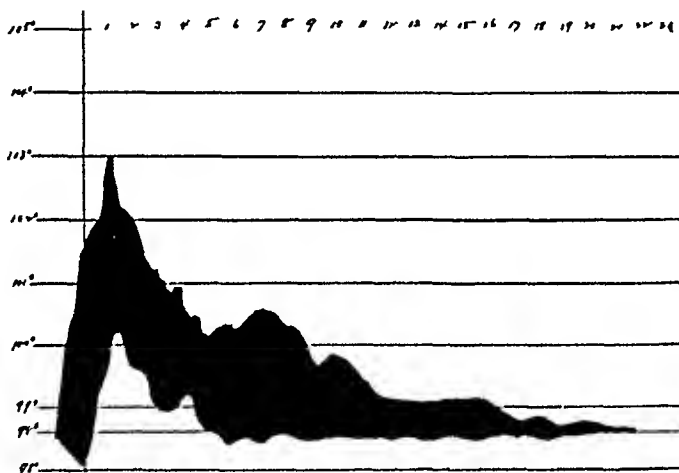
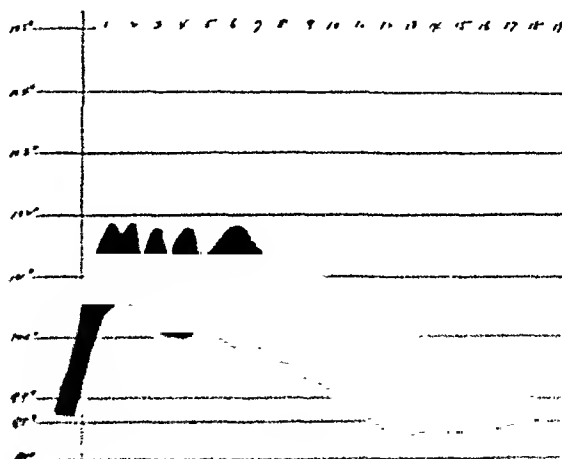


Fig. 2.—Temperature zone in elective classical cesarean sections for disproportion. Maternal mortality, 1 in 110, 0.9 per cent; puerperal morbidity, 61 in 110, 46 per cent; average number of postoperative hospital days, 16.



Two patients with fibromyoma uteri were treated by operation during the puerperium; one by vaginal hysterectomy because of persistent bleeding, the other by posterior colpotomy draining an abscessed fibroid in the posterior culdesae.

In a group of eight patients (Table III) only two patients required major operative treatment; one a right ureterolithotomy, the other a nephrectomy for hydronephrosis and stricture of the right ureter. The remaining six patients were treated by cystoscopy with ureteral catheterization at the gestation period indicated in the chart.

All of these patients had ovarian cysts (Table IV); only two were operated upon before viability of the fetus. One of them aborted twenty-four hours after removing a simple cystoma in an eight weeks'

TABLE III. URINARY TRACT DISORDERS

AGE	PARITY	CONDITION	WEEKS OF GESTATION	TREATMENT	FATE OF FETUS
28	i	Right stone, pyelitis	16, 24, 28	Cystoscopy, ureteral catheter	Term delivery
26	0	Pyelitis	26	Cystoscopy, ureteral catheter	Term delivery
26	0	Pyelitis	28	Cystoscopy, ureteral catheter	38 weeks' delivery Living child
30	0	Pyelitis	28	Cystoscopy, ureteral catheter	36 weeks' delivery Living child
27	i	Pyelitis	30	Cystoscopy, ureteral catheter	Monstrosity at term
32	ii	Right stone, pyelitis	30-40	(6x) cystoscopy, ureteral catheter	Term delivery
30	iii	Right stone	24	Ureterolithotomy	Term delivery
27	i	Right hydronephrosis, strictured ureter	16	Right nephrectomy	Term delivery

TABLE IV. OVARIAN TUMORS

AGE	PARITY	TUMORS	WEEKS OF GESTATION	FATE OF FETUS	LIVING CHILD	MATERNAL MORTALITY
27	0	Left simple cystoma	8	Miscarried after 24 hours	0	0
25	i	Twisted right corpus luteum	16	To term	+	0
28	0	Twisted hydatid Morgagni	37	Delivery after 24 hours	+	0
31	ii	Left simple cystoma	38	Delivery after 40 hours	+	0
40	0	Bilateral dermoids	Term	Cesarean, supra-vaginal hysterectomy	+	0
36	i	Left simple cystoma	Term	Low cervical section	+	0
35	iii	Right dermoid	Term	Porro section (fibroids)	+	0
24	0	Twisted right simple	6th post-partum day			0
35	0	?	Term	Not operated	+	0

Notable, of course, is the contrast between classical cesarean section performed either as an elective operation or early in labor, and the operation when executed after twelve hours or more of labor. Quite significant, too, is the comparison of temperature zones in local anesthesia and ether anesthesia.

CESAREAN SECTION IN DISPROPORTION

Table V is a capitulation of the morbidity and mortality of cesarean section performed for disproportion. The elective classical operation in 110 patients, and the classical operation done before twelve hours of labor in 15 patients have a combined mortality of 1 in 122 or 0.82 per cent; while the operation done after twelve hours of labor has a mortality rate in classical section of 8 per cent and in low cesarean section of 3.5 per cent. It will be noted that the total mortality rate for cesarean section in disproportion is 5 in 191 or 2.6 per cent, a figure which is



Fig. 7.—Temperature zone in cesarean sections under local, or local and nitrous oxide oxygen anesthesia. Maternal mortality, 3 in 62, 4.8 per cent; puerperal morbidity, 32 in 62, 52 per cent; average number of postoperative hospital days, 16.

much in contrast to the entire series of cesarean sections (6.1 per cent). It will also be seen that the deaths in disproportion share an equal rôle with the deaths of placenta previa in producing maternal fatalities.

Opinion has held that premature rupture of the membranes plays an important part in cesarean section death. In the group of 229 cases here reported, the membranes were ruptured prematurely in 16 instances; in 14 of these, puerperal morbidity developed (87.5 per cent); in one instance, fatality occurred. In the latter case the membranes had ruptured for two days before admission. The death was from septic infection (Table VI).

THE COURSE OF SUBSEQUENT PREGNANCIES

An always interesting but worrisome problem for the performer of cesarean section is that of the prognosis in future pregnancies. Sixty patients of this series were those observed in deliveries subsequent to one

In one of these patients the basal metabolic rate was only +17 per cent and operation was done for pressure symptoms produced by a large colloid goiter. The other patient with twins exhibited a marked increase in rate up to +72 per cent and a toxic adenoma was removed after preliminary medical management.

Only two of the remaining operations (Table VII) had any effect upon the immediate maternal or fetal mortality rate. One patient seen

TABLE VII. MISCELLANEOUS OPERATIONS

	AGE	PARITY	WEEKS OF GESTATION	FATE OF FETUS	MATERNAL MORTALITY	LIVING CHILD
Breast Lipoma (axillary)	22	i	4th day post-partum		0	
Carcinoma left	31	0	28 weeks	Term delivery	0	+
Carcinoma right	38	?	?	Not yet delivered	0	
Accessory mammary gland	?	ii	28 weeks	Threatened premature labor 3 times, term delivery	0	+
Hemorrhoids	34	iv	28 weeks	Term delivery	0	+
Hemorrhoids	28	i	24 weeks	Term delivery	0	+
Hemorrhoids	30	ii	24 weeks	Term delivery		
Hemorrhoids (4 cases)			At delivery		0	
Bartholinian abscess	25	0	14 weeks	Term delivery	0	+
Bartholinian abscess	23	0	16 weeks	Term delivery	0	+
Bartholinian abscess	?	0	16 and 20 weeks	Not yet delivered	0	
Carcinoma sigmoid colon	43	iv	28 weeks	Delivered 72 hours post-operative	+	+ lived 1 day
Carcinoma rectum	?	iii	8 weeks	Term delivery	0	+
Right indirect inguinal hernia	23	i	24 weeks	Term delivery	0	+
Ventral hernia	37	?	8 weeks	Aborted 8 hours post-operative	0	0
Incarcerated uterus	34	0	13 weeks	Term delivery	0	+

first in the seventh month had carcinoma of the sigmoid colon complicated by bowel obstruction. A colostomy was done and the patient died on the third postoperative day. A fetus delivered a few hours before her death lived for twelve hours. Another patient had a resection of the rectum and colostomy. An eight weeks' pregnancy was not diagnosed at the time. She carried the pregnancy to term and delivered normally.

One abortion occurred in an eight weeks' pregnancy forty-eight hours after the repair of a large ventral hernia.

during the last weeks of pregnancy. The rupture in Patient 2 was found upon performing a section early in labor. The complete rupture in Patient 3 was sustained during active labor. Laparotomy and hysterectomy were performed in 2 and 3; classical operation, repair of the uterine scar and sterilization of Patient 1. All the mothers survived.

In addition to the patients with actual rupture, there were 7 patients in whom at the time of subsequent operation a decidedly weak uterine scar was found. From a review of these patients' histories, and from a consideration of personal experience in ward and private practice, I am convinced that we have no accurate criterion of the condition of the uterine scar in subsequent pregnancy. The record of the temperature chart is certainly not dependable. While definite evidence of infection and purulent discharge is to be accepted as an indication of faulty healing, yet many patients who have had unrippled convalescence show pro-

TABLE VIII. MATERNAL MORTALITY AND PUERPERAL MORBIDITY IN SUBSEQUENT PREGNANCIES

	MORTALITY	MORBIDITY
Vaginal delivery	0 in 12 = 0.0%	2 in 12 = 16.0%
Abdominal delivery	2 in 46 = 4.3%	28 in 46 = 60.0%
Total	2 in 58 = 3.4%	30 in 58 = 51.8%
<i>Deaths</i>		
Septic infection		1
Chronic nephritis and pneumonia		1
<i>Causes of Morbidity in Abdominal Delivery</i>		
Reaction from operation (cause unknown)		12 = 25%
Infection of abdominal incision		10 = 22%
Local uterine infection		2
Pelvic peritonitis		1
Bronchitis and pneumonia		2

found weakness of the uterine incision in subsequent pregnancy. Possibly the position of the placenta, and the erosive action of the chorionic villi when the organ is implanted beneath the old incision, are more important factors in etiology.

The author has come to the conclusion that the burden of proof in subsequent pregnancies is not that the uterus might rupture, but that the wall is strong enough to sustain pregnancy and the strain of labor.

Peritoneal adhesions are encountered almost universally in subsequent cesarean sections. In 17 cases of the 46 abdominal deliveries they were described as being particularly dense. How great a hazard these may become in the production of intestinal obstruction is difficult to estimate. In this group of cases, no instances of immediate postoperative intestinal obstruction were encountered. In 2 patients, chronic intestinal obstruction was relieved at subsequent operations. Why this complication does not occur more commonly, I am at a loss to explain.

Fixation of the uterus to the abdominal incision, as a manifestation of peritoneal adhesion, was noted in 26 of the postoperative examinations; although it was determined that in those instances where the patient

THE INFLUENCE OF MEDICAL DISEASES ON OBSTETRIC AND FETAL MORTALITY*

EDWARD ALLEN, M.D., AND CARL P. BAUER, M.D., CHICAGO, ILL.

(From the Obstetrical Department, Presbyterian Hospital, and the Out-Patient Department, Rush Medical College of the University of Chicago)

THIS report represents a critical study of 9,696 consecutive uterine pregnancies. We have divided these cases into three groups for comparison. The first group consists of women not afflicted with medical or surgical diseases. The second group is composed of patients suffering with medical diseases. These medical diseases we have classified according to the classification proposed by Adair and Stieglitz in their recent book on *Obstetric Medicine*. The third group represents individuals affected with surgical complications. These complications will be presented by Dr. Fred O. Priest.

Table I represents the termination of the 9,696 consecutive uterine pregnancies covered in this study.

Table II is a gross comparison between the obstetric outcome of 6,007 women not afflicted with medical or surgical disease and 3,358 patients afflicted with medical diseases. Some of the noteworthy comparisons shown in this table are,

TABLE I. TERMINATION OF PREGNANCY

Term births	8,773
Premature births (viable to thirty-eighth week of gestation)	592
Spontaneous abortions (conception to sixteenth week)	53
Incomplete spontaneous abortions	194
Therapeutic abortions	37
Therapeutic abortions and sterilization	22
Miscarriages (sixteenth week to twenty-eighth week of gestation)	25
Total	9,696

TABLE II. GROSS COMPARISON OF THE OBSTETRIC RESULTS BETWEEN NORMAL PATIENTS AND PATIENTS WITH MEDICAL DISEASES COMPLICATING THEIR PREGNANCIES

NORMAL PATIENTS—6,007			PATIENTS WITH MEDICAL DISEASES—3,358	
		PERCENTAGE		PERCENTAGE
Term	5,696		3,077	
Premature	311	5.4	281	9.1
Gross fetal mortality	111	1.8	116	3.7
Afebrile	5,704	95.0	3,040	90.9
Febrile	303	5.0	318	9.1
Maternal deaths	4	1 in every 1,501 deliveries	11	1 in every 305 deliveries
Normal delivery	5,357		2,902	
Gross operative delivery	650	10.8	456	13.9

*Read at a meeting of the Chicago Gynecological Society, November 15, 1935.

DISCUSSION

DR. JAMES L. RICHARDS.—It has been estimated that one mother out of every 150 dies of complications of pregnancy or the accidents of labor, and for every patient who succumbs ten are seriously ill. In other words, the annual puerperal morbidity in this country totals approximately 250,000. Statistics show that puerperal morbidity increases proportionately with an increase in the number of operative deliveries of which cesarean section is the chief offender.

In reviewing the literature, one is impressed with the variety of standards employed in different clinics and by different individuals as criteria for morbidity. Would it not be best to regard, as morbid, all puerperia in which there is an elevation above 99° at any time. The fallacy of the commonly accepted criteria may be realized when one considers that a woman having an elevation of 100.4° on the second or third postoperative day, due to postoperative reaction, would be listed as having a morbid convalescence, while another patient may have a temperature range between normal and 100.3° during most of her postoperative convalescence, due to a low-grade wound infection, yet she would be classed as nonmorbid.

During the past five years and eleven months there have been 2,725 ward and private deliveries at the Bryn Mawr Hospital Maternity. Ninety cesarean sections have been performed by six members of the courtesy staff and by Dr. Behney and myself. Seventy-six (84.4 per cent) were of the classical type; 12 (13.3 per cent) of the cervical type; and 2 (2.2 per cent), cesarean sections with hysterectomy. In 33 of these patients the convalescence was morbid, based on a temperature of 100.4° on any two puerperal days, a morbidity of 36.6 per cent.

In 11 patients no cause could be found for the morbidity since the temperature was not elevated after the third postoperative day. Of the remaining 22, 3 developed wound infections; 3 femoral phlebitis; 3 local uterine infections; 2 pyelitis; 2 severe anemia (fever 101° following transfusions); 1 paralytic ileus with eventration; 1 cystitis; 1 subvesical hematoma; 1 bronchitis; 1 recrudescence of an old pulmonary tuberculous lesion; 1 bronchopneumonia. There were 3 deaths: 1 from intestinal obstruction, 1 from paralytic ileus with eventration, and 1 from puerperal eclampsia, a mortality rate of 2.3 per cent. Sixty-five of the cesarean sections were elective. Of that number, 25 had had previous abdominal deliveries. The morbidity rate in the elective cases was 17 per cent. There were no deaths. Of the 25 emergency cases, 20, or 80 per cent, were morbid. The three deaths occurred in this group.

DR. JOHN McGLINN.—At St. Agnes Hospital there is a rule that no cesarean section may be done without a consultation. This also applies to the Philadelphia General Hospital. We feel satisfied at St. Agnes that we have cut down the number of cesarean sections and therefore have avoided some of the associated disasters and complications.

On the other hand, I think we have been obsessed often times with the danger of examination of the patient during labor. Dependence on rectal examination frequently allows patients to go too far before the need of a section is recognized. If cesarean section must be done, the sooner it is done the better, and the patient should not be weakened by labor trials.

Table IV graphically substantiates the effect of these diseases on premature birth and consequent fetal mortality as reported by Dr. Parmalee at Cook County Hospital.

TABLE V

DEATHS IN 6,007 NONMEDICAL CASES	DEATHS IN 3,358 MEDICAL CASES
1. V. W., aged forty, para v; 5 forceps deliveries; all stillbirths; elective low cesarean section at term. Death fourth day postpartum, peritonitis. Culture: <i>Staphylococcus aureus</i> and diphtheroids.	1. A. R., aged 34, para v. Decompensated heart. Death third day. Postmortem mitral, aortic and tricuspid endocarditis.
2. M. L., aged 25, primipara; dystocia; classical cesarean section. Intestinal obstruction. Death sixth day.	2. A. S., aged twenty-nine, primipara, midforceps. Mitral stenosis and fetal asphyxia. Death ninth day, lobar pneumonia.
3. S. G., aged 19, primipara; low forceps. Death 5 hours. Coroner's report: status lymphaticus.	3. C. C., aged 31, para iii, entered hospital temperature 102°, ruptured membranes, double footling; douche taken 14 hours before delivery. Death fourth day. Postmortem septic infarcts lungs, peritonitis.
4. M. K., aged 23, primipara; spontaneous delivery. Death twenty-sixth day, puerperal sepsis; spontaneous perforation ileum postpartum.	4. V. B., aged 40, primipara; attempted version; shock, death. Postmortem uterus intact.
<p><i>Not Classified</i></p> <p>1. Criminal abortion, sepsis and death.</p>	5. C. B., aged 17, primipara; dystocia, classical cesarean section. Death twelfth day, peritonitis, streptococcus and <i>B. coli</i> .
	6. P. N., aged 38, para x; placenta previa centralis, classical cesarean section. Death eighth day, pulmonary embolism postmortem.
	7. M. P., aged 22, primipara. Normal delivery; 5 large apical abscesses. Death thirteenth day, streptococcus peritonitis.
	8. M. G., aged 32, para ii; bag induction, spontaneous labor. Death fourteenth day, puerperal sepsis.
	9. L. C., aged 38, primipara, died during forceps delivery; ether; no autopsy.
	10. M. M., aged 35; para viii; precipitate delivery, convulsion immediately following delivery, death. Toxemia.
	11. M. R., aged 36, multipara. Precipitate labor, unrecognized ruptured uterus, retroperitoneal hematoma. Death 36 hours. Ankylosis hip joint, tuberculosis?
	12. Hyperemesis gravidarum, refused interruption until 10 hours before death.

Table VI is a summary of the essential features of all the maternal deaths. One-fifth of the maternal deaths were due to medical diseases. Death from sepsis is more frequent when pregnancy is complicated by medical ailments.

TABLE I

AUTHOR	MENSTRUAL BLOOD LOSS	REFERENCE
Anspach	4- 6 oz.	Gynecology, Philadelphia, 1924, J. B. Lippincott Co., p. 66.
Astruc	8- 10 oz.	Quoted by Novak: Menstruation and Its Disorders, 2: New York, 1931, D. Appleton-Century Co., p. 91.
Baudelocque	3- 4 oz.	Quoted by Novak, loc. cit.
Crossen	150-300 c.c.	Diseases of Women, St. Louis, 1930, The C. V. Mosby Co., p. 829.
Das	55-200 c.c.	A Treatise of Midwifery, Calcutta, 1921, Thacker Spink and Co., p. 36.
Eichmann	2.61-61.25 c.c.	Inaugural Dissertation, University of Kiel, 1911.
Fitzgerald	14- 15 oz.	Quoted by Novak, loc. cit.
Freind	10 oz.	Quoted by Novak, loc. cit.
Fraenkel	30- 50 gm.	Physiologie der weiblichen Genitalorgane. Halban-Seitz Biologie und Pathologie des Weibes. Vol. 1, Berlin, Urban and Schwarzenberg, 1924, p. 550.
Fulkerson	12-15 napkins	Textbook of Gynecology, Philadelphia, 1929, P. Blakiston's Son and Co., p. 104.
Galen	18 oz.	Quoted by Novak, loc. cit.
Gebhard	90-240 gm.	Die Menstruation, Veit's Handbuch d. Gynec. 3: 1898, p. 1.
Gilbert	120-240 gm.	Quoted by Lahille: Ann. de gynéc. et d'obst. 72: 535, 1917.
Gley	200-500 gm.	Quoted by Lahille, loc. cit.
Gorter	Not over 6 oz.	Quoted by Novak, loc. cit.
von Haller	6-8-12 oz.	Quoted by Novak, loc. cit.
Haen	3- 5 oz.	Quoted by Cazeau: Theoretical and Practical Midwifery, Philadelphia, 1871, Lindsay and Blakiston, p. 107.
Hensen	100-200 gm.	Quoted by Hoppe-Seyler: Ztschr. f. physiol. Chem. 42: 545, 1904.
Hippocrates	20 oz.	Quoted by Novak, loc. cit.
Hoppe-Seyler	26- 52 c.c.	Ztschr. f. physiol. Chem. 42: 545, 1904.
Howell	100-200 c.c.	Textbook of Physiology, Philadelphia, 1932, W. B. Saunders Co., p. 1049.
Kelly	60-240 c.c.	Gynecology, New York, 1928, D. Appleton-Century Co., p. 118.

hemorrhage. Another patient who died of hemorrhage following rupture of the uterus had pyelitis and cystitis. One case of sepsis was complicated by pneumonia which, although not the decisive, was a contributing factor. Another death from sepsis occurred in a patient who, during her pregnancy, had had an operation for drainage of an appendiceal abscess. One case of hyperemesis was complicated by chronic endocarditis and another by diabetes. One of the cases of embolism had an accompanying vegetative endocarditis. Thus, out of 26 cases there were seven with serious medical or surgical complications.

Fifteen deaths occurred from complications which had nothing in particular to do with the pregnancy. In these patients the pregnancy was the complicating factor rather than vice versa. There were three cases of cardiac death; three cases of meningitis, one a tuberculous meningitis; two cases of pneumonia; and one each of agranulocytosis, diabetes, diphtheria, gonorrheal endocarditis, hyperthyroidism, nephritis, and pulmonary tuberculosis.

We could, therefore, state that 50 per cent of the deaths were affected by definite medical or surgical complications and that 15 out of the 41 deaths were definitely due to medical or surgical complications and not to the pregnancy.

DR. RALPH REIS.—We must revise our ideas that a pregnancy is complicated by appendicitis and must now consider that we have patients with appendicitis and a complicating factor of pregnancy. Ten to twelve years ago Drs. Daly and Strouse suggested that we should consider the pathologic condition as the primary disease and consider the pregnancy as the complication.

I wonder if it is advisable to regard fibroids requiring myomectomy at the time of cesarean section as being a surgical complication of pregnancy or vice versa. It seems to me those patients cannot be considered in analyzing the maternal or fetal death rate. This must also hold for patients delivered by Porro section. I would like further to raise the question of whether you consider ureteral catheterization a surgical procedure or one of simple instrumentation. If we were to take out that group and take out the group of hemorrhoids done at the time of delivery, we would find Dr. Priest's statistics to be different from those given us because there would then be 43 patients with major surgical conditions. The miscarriages would average 10 per cent and the maternal death rate would be 2.5 per cent rather than 1.3 per cent.

One other point I would like to discuss is the advisability of permitting patients with malignant disease to carry their pregnancies to term. We have felt that the burden upon the maternal organism from the effects of irradiation was too severe to permit these pregnancies to go on. Radiation lowers the blood calcium and inhibits the hematopoietic system so that a secondary anemia is produced similar to that of a pregnancy. The combination is more than any patient should be asked to bear.

DR. PHIL DALY.—There is one point upon which I am not quite clear in the consideration of medical complications of pregnancy. Are these obstetric or medical deaths?

As to anemia as a cause of increased death rate, what are the causes of anemia? May not the underlying condition which produces the anemia be really the cause of death?

I agree very sincerely with the paper as a whole, that medical conditions present during pregnancy warrant some consideration. I think the mistake has been to hesitate to treat medical or surgical complications because of the pregnancy.

DR. N. SPROAT HEANEY.—One point I wish to make is the necessity of having the patient in as good condition as possible during pregnancy by the removal of all possible foci of infection. Years ago thrombophlebitis or "milk leg" was not an unusual complication after delivery but now we find it rather rarely, due in

TABLE II

CASE	AGE	MARRIED OR SINGLE	NUMBER OF CHILDREN	BLOOD			NAPKINS USED	DURATION OF PERIOD—DAYS	MENSTRUAL LOSS		
				ERYTHROCYTES MILLIONS	HEMATOCRIT PER CENT	HEMOGLOBIN GRAMS			IRON MG.	HEMOGLOBIN GRAMS	BLOOD C.C.
1	40	M	0	3.900	37.5	10.370	5	3	2.28	0.680	6.66
2	27	M	0	5.040	46.5	14.730	4	4	4.14	1.235	8.38
3	19	S	0	4.180	43.0	12.200	6	3	3.84	1.146	9.39
4	31	S	0	4.740	40.5	12.200	4	2	4.10	1.223	10.24
5	37	S	0	4.120	35.0	10.370	4	4	3.78	1.128	10.87
6	25	M	2	4.630	39.0	10.220	7	3	3.85	1.149	11.23
7	35	S	0	4.310	41.0	11.570	10	4	4.75	1.417	12.24
8	21	M	1	4.830	38.5	10.730	4	5	4.62	1.379	12.85
9	27	S	0	4.790	42.0	11.990	6	4	5.20	1.552	12.94
10	21	S	0	4.530	40.0	11.780	6	4	5.12	1.528	12.97
11	20	S	0	3.950	38.0	11.780	9	5	5.60	1.671	14.18
12	20	S	0	4.040	37.0	11.570	6	3	5.60	1.671	14.44
13	33	S	0	4.100	35.0	10.520	8	5	5.47	1.632	15.51
14	37	M	0	4.690	40.0	10.940	10	3	6.00	1.791	16.35
15	20	S	0	4.680	39.0	12.410	14	5	7.20	2.149	17.31
16	19	S	0	4.650	44.0	11.360	11	3	6.60	1.970	17.34
17	33	M	0	4.680	41.0	11.990	9	4	7.02	2.094	17.46
18	25	S	0	4.590	37.0	11.990	11	6	7.86	2.347	19.57
19	32	S	0	4.200	37.0	11.570	7	4	7.60	2.268	19.60
20	41	S	0	4.770	44.0	12.410	11	5	8.56	2.555	20.58
21	28	S	0	4.220	41.0	11.360	14	6	7.92	2.364	20.80
22	26	S	0	4.780	42.0	12.200	9	5	8.60	2.567	21.04
23	27	S	0	4.110	39.0	11.780	9	6	8.32	2.483	21.07
24	29	S	0	4.270	42.0	12.410	9	4	8.88	2.650	21.35
25	42	M	2	4.770	40.0	12.625	13	5	9.10	2.716	21.51
26	36	M	0	4.610	40.5	12.410	6	3	9.00	2.686	21.64
27	19	S	0	4.600	42.0	11.990	5	3	8.82	2.632	21.95
28	29	S	0	4.360	42.5	11.150	11	6	8.83	2.486	22.29
29	31	S	0	4.370	39.0	12.200	5	2	9.52	2.841	23.21
30	21	S	0	4.050	39.0	12.410	12	6	9.66	2.883	23.23
31	20	S	0	3.960	35.0	10.220	7	6	8.70	2.597	25.41
32	26	M	0	3.380	33.0	10.220	13	6	8.75	2.611	25.54
33	22	S	0	4.890	40.0	10.220	12	5	9.00	2.686	26.28
34	22	S	0	4.290	38.0	10.220	8	4	9.00	2.686	26.28
35	25	M	1	5.280	39.5	11.570	7	3	10.56	3.152	27.24
36	27	S	0	4.580	40.0	12.280	10	3	11.36	3.391	27.61
37	30	S	0	4.070	40.5	12.410	15	6	11.55	3.447	27.77
38	23	S	0	3.980	41.0	11.990	8	4	11.60	3.462	28.87
39	21	S	0	4.630	40.0	13.190	13	4	12.92	3.855	29.22
40	31	S	0	5.250	47.0	12.200	12	5	12.10	3.611	29.59
41	31	S	0	4.480	40.0	11.940	15	3	12.01	3.585	30.02

AN UNUSUAL CASE OF POSTOPERATIVE EMBOLUS*

JOHN J. MADDEN, M.D., BROOKLYN, N. Y.

POSTOPERATIVE embolus resulting in pulmonary infarction occurs frequently enough on all surgical services. The journey of the embolus from the thrombus in the vein to the lungs is a logical one and easily followed.

An embolus detached from a pelvic vein thrombus, ultimately producing death by damage in the peripheral circulation, requires much more explaining and occurs much less frequently.

Arterial emboli originating from some source in the left side of the heart or in the arteries themselves are not to be confused with the condition referred to above. For an embolus detached from a pelvic vein thrombus to directly reach the peripheral circulation certain gross developmental defects of the heart must be present, such as an interventricular septum, patent ductus arteriosus or a patent foramen ovale. These conditions would be found at autopsy but were not found in the case under discussion.

From our autopsy findings we believe we can explain the sequence of events that occurred from the propagating thrombus in the pelvic veins to the end-result as follows: Formation of antemortem clots in both internal iliac veins. From one or both of these thrombi, very small emboli were detached, producing small pulmonary infarctions. These were not large enough in themselves to produce any subjective symptoms. In the veins draining these small infarcted areas, secondary thrombi formed and from these were detached the emboli producing the fatal accident.

Miss C. S., a fifty-seven-year-old white woman, consulted her physician because of a "feeling of weight" in the lower abdomen. She had always been well, no serious illness or operations. Menses began at about fourteen years of age, regular, recurring every twenty-eight days, and ceased about nine years ago.

Her doctor found a pelvic tumor and referred her to me for operation. Nothing was found on general physical examination to contraindicate this elective procedure. The patient led a fairly active life and continued work until the day of admission to the hospital Sept. 3, 1935.

The preoperative study showed Hg 87 per cent, R.B.C. 4,120,000, W.B.C. 10,000, polymorphonuclears 64 per cent, mononuclears 36 per cent. The urine was negative, sedimentation time was two hours and forty minutes. Blood pressure was 132/84.

Physical examination led to a diagnosis of ovarian cyst (left). The operation was on September 4, the anesthetic used was avertin 80 mil. dose and was supplemented with gas-oxygen and ether.

The tumor was found to be a simple ovarian cyst, easily removed. The appendix was also easily removed. She had a smooth convalescence, slight febrile reaction for the first three days, never over 100.2° F. and normal thereafter.

On the twelfth day after operation patient was allowed out of bed, and this was accomplished without fatigue. The next morning she again was out of bed but complained of weakness and remained up only ten minutes. She was worried and depressed about this but that afternoon she wanted to get out of bed again. This time while being aided by the nurse she became unconscious and was returned to bed.

Shortly after when seen by me there was a right hemiplegia and the left radial pulse could not be felt. The patient was inarticulate, could not swallow, and voided

*Read before the New York Obstetrical Society, November 12, 1935.

which might have occurred at that time as a result of hydremia and changes in the water balance. No significant reticulocytosis was observed in the blood immediately following menstruation. The blood hemoglobin values ranged from 10.20 (the arbitrary lower limit) to 14.74 gm. per 100 c.c. On the whole, these values, as well as those of other normal groups which we have studied, are lower than the accepted normal hemoglobin values, although our Newcomer disk has been checked repeatedly by various methods (Van Slyke, blood iron and with known solutions of hemoglobin) and has been found to be accurate.

One of the common criteria on which the physician bases his estimation of the menstrual flow is the duration of the menstrual period. Table III shows this factor in relation to the actual blood loss. It is evident that as the duration of the period increases the average blood loss increases but there are marked variations as in Case 88 where the blood loss was 109.00 c.c. in three days and in Case 42, where there was a loss of 31.07 c.c. in seven days.

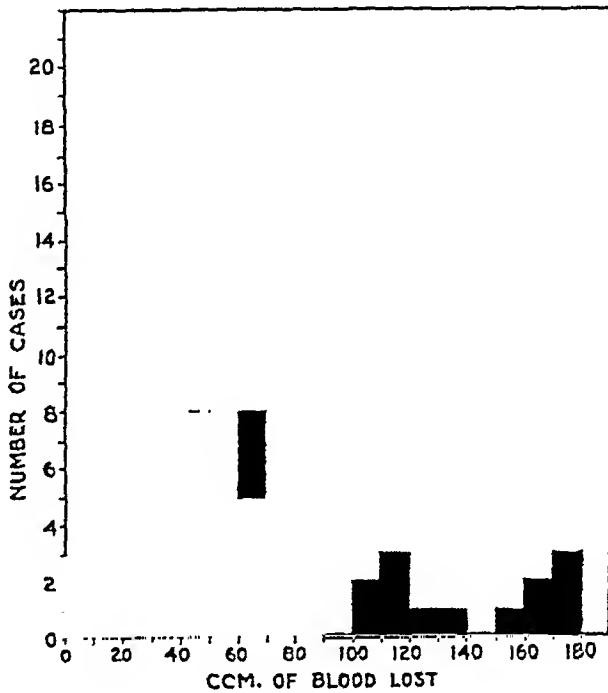


Fig. 1.

Liver was natural in size and shape. Capsule was smooth. On section very slight prominence of central vein zones was present. Gallbladder and ducts were natural.

Spleen, pancreas, kidneys, and adrenals were normal.

Uterus was atrophic. Right adnexa was normal, left tube slightly thickened and clubbed, but no active inflammation present. Inferior leaf of sigmoid meso was slightly adherent to site of ovary.

Left cerebrum obviously was larger than the right and its convolutions were slightly flattened. Pia-arachnoid was normal. There was very slight atheromatosis of the cerebral vessels. The left middle cerebral artery from near its origin for about 1.5 cm. was found to be completely occluded by a grayish red antemortem embolus (seemed to have been forced into vessel rather than a local thrombus).

On section there was found to be soft red infarction of lateral two-thirds of left lenticular nucleus, and of an area some 3 cm. broad by 5 cm. sagittally of anteromedial portion of left frontal lobe, involving the interhemispherical sulcus. Remainder of lobe was somewhat edematous, and the left lateral ventricle was somewhat smaller than the right. Its fluid was slightly blood tinged.

Interpretation: Apparently thrombosis of both internal iliac veins allowed small pulmonary emboli to form pulmonary infarcts, these, in turn, initiating pulmonary thrombi which gave rise to the left cerebral and brachial emboli.

Cause of Death: Cerebral embolus and left encephalomalacia. Pulmonary infarction; secondary to left oophorectomy and appendicectomy.

1168 DEAN STREET

DISCUSSION

DR. RAYMOND MILES.—This case is a relatively unusual one, but I think the sequence of events is quite clear.

The patient was a woman fifty-seven years of age whose peripheral vessels seemed to be in fairly good condition. The myocardium, grossly and microscopically, showed very little abnormal, but there was nevertheless evidence of a slight cardiac failure in the mild degree of chronic passive congestion of the liver.

It was impossible to determine from which source the emboli to the left middle cerebral artery and left brachial artery had arisen. The only question was whether the arterial lesions were thrombi locally formed, or emboli. I feel that they were emboli because the arterial walls, except for the aorta, were quite smooth and showed no signs of previous disease.

We do not know the cause of the thrombi, but this patient exhibited more of a tendency to form these than the average person, although we know that postoperative pulmonary infarctions, especially when small and often silent, are very common occurrences.

This case is interesting from a diagnostic point of view, since one must think, first, of a mural thrombosis of the left ventricle with secondary peripheral infarction; second, of a mural thrombosis, usually of the arch of the aorta; or, third, of a congenital defect in the septum of the heart or foramen ovale, allowing a paradoxical embolus to occur. The latter is the most unusual of these conditions.

DR. CHARLES R. STOCKARD.—In all such cases where there is a thrombus in a vein and, finally, an embolism in the cerebral artery, it is almost impossible, and certainly very difficult from an anatomical standpoint, to know how the embolus can get through the pulmonary capillaries into the arterial circulation. It comes up the vein, of course, into the heart and then goes to the lungs by way of the pulmonary artery. The question is: How does it get through the pulmonary vein into the cerebral artery? How can it get through the pulmonary capillaries, because that is the problem one always has to contend with in a cerebral embolism.

DR. MADDEN (closing).—We do not think that this particular embolus which became detached from the pelvic veins was the same one which finally reached the

though it went unnoticed by the subject. Most of these patients showed only a moderate variation although in Cases 9, 10, 12 and 13, one would expect the difference to be subjectively apparent.

While the menstrual loss has been reduced to terms of cubic centimeters of blood to give a more graphic description of the results, it is not the volume per se but the hemoglobin and iron content of the menstrual flow which is of vital importance. The loss of 2.28 mg. of iron per period (Case 1) would require a daily iron storage of 0.08 mg. to replace this loss alone. A menstrual loss of 78.90 mg. which was found in Case 100 necessitates a positive iron balance of 3.29 mg. of iron for each day of her regular twenty-four-day cycle. The results of iron balance studies, which are to be reported later, indicate that the latter amount is far greater than the average daily iron retention and may be attained only by the administration of iron in addition to that obtained from the diet. This continuous excessive iron loss may account for certain cases of hypochromic anemia which have been considered as idiopathic in origin. While this may not be the only etiologic factor in all such cases, it undoubtedly plays an important and frequently an unrecognized rôle.

One is not justified in setting definite limits on what may be considered as the normal menstrual blood loss, but it is significant that 50 per cent of this representative group of women lost between 23.21 and 68.43 c.c. of blood. The smallest amount, 6.55 c.c., is far below the average and, in that sense, is abnormal. The same is true of those with the greater blood losses and although a careful examination revealed nothing to account for the excessive flow, they can hardly be considered as normal. It seems probable that such large menstrual losses would have a deleterious effect on the hematopoietic system if long continued.

SUMMARY

The menstrual blood loss in 100 apparently normal women ranged from 6.55 c.c. to 178.69 c.c. with an average of 50.55 c.c. Fifty per cent of these women lost between 23.21 c.c. and 68.43 c.c.

The duration of the period and the number of napkins used give only a vague idea of the amount of menstrual flow.

The effect of this loss of iron on the hematopoietic system is considered briefly.

REFERENCES

- (1) *Osgood, E. F., Haskins, H. D., and Trotman, P. E.*: J. Lab. & Clin. Med. 17: 859, 1932. (2) *Reis, F., and Chakmakjian, H. H.*: J. Biol. Chem. 92: 59, 1931.

The following procedure advocated by McNeile⁴ was adopted:

Two doses of camphor-in-oil, $1\frac{1}{2}$ gr. each, were given intramuscularly (into the buttocks) the first day (in morning and afternoon). One injection of $1\frac{1}{2}$ gr. was then given daily for three successive days, making the total number of injections five. The use of cathartics, ice bags, binders, and restriction of fluids were avoided except in the few cases where it was obvious that therapy failed. All breasts were examined every twelve hours for the first forty-eight hours, every six hours for two days and daily thereafter.

For practical purposes, at the start of this investigation it was found necessary to differentiate the reactions in the breasts into the three following degrees:

First degree: The breasts showed absent or slight filling and were symptom-free.

Second degree: Breasts showed moderate fullness accompanied by slight pain and tenderness.

Third degree: Breasts revealed marked fullness (even to the extent of caking) and secretion associated with severe pain and tenderness.

RECORD OF CASES STUDIED

Thirty patients were used as controls (Group I). These patients did not receive injections of camphor-in-oil or catharsis. Neither were fluids restricted. No attempt was made in any way to inhibit lactation. Beginning the third day postpartum in 25 patients, the breasts showed early evidences of lactation (first degree engorgement). Within forty-eight hours, 10 cases showed moderate fullness accompanied by mild pain and tenderness (second degree engorgement), and 15 cases revealed marked engorgement and associated with severe pain and tenderness (third degree engorgement). The acute symptoms lasted approximately thirty-six hours before beginning to subside. By the eighth day, involution was completed (see Fig. 1). In five cases, however, the breasts remained practically symptomless throughout the entire postpartum course. Why the lactating process was inhibited in the five patients cannot be explained, as there was no cause found to be common to all. Therefore, in the control Group I, it is quite evident that the predominant mammary reaction is that of a second degree or third degree engorgement, which begins about the second day postpartum, reaches its height the third or fourth day, lasts for thirty-six hours and then gradually subsides to the nonlactating state about the eighth or ninth day.

Camphor-in-oil was used in 60 postpartum patients (Group II) of whom half received the first injections within twenty-four hours after delivery (Group IIa) and the other half, after the onset of lactation (Group IIb).

The 30 patients in Group IIa who received camphor-in-oil within twenty-four hours after delivery exhibited the following breast reactions (Fig. 2): In 24 patients (80 per cent), either no engorgement or at the most, a first degree reaction developed. In the remaining 6 patients (20 per cent), 2 patients developed a second degree reaction and 4 patients a third degree engorgement, running a course similar to the control series. These patients should be considered as failures. Among the 24 that failed to develop further than a first degree engorgement, there were no factors common to all except for the use of camphor. The age, duration of pregnancy, parity, and indication for weaning were so variable that no relation could be demonstrated between them and the failure of the breasts to progress to further engorgement.

Thirty patients in Group IIb were treated after twenty-four hours postpartum. In 4 patients, all of whom were less than ninety-six hours postpartum, the breasts

be small, dark staining or large, clear and vesicular. There are masses of small, well-defined, polyhedral cells with large nuclei whose origin from the Langhans' cells is quite apparent. These two cellular elements vary in proportion in different tumors. Last, there are present varying numbers of intermediate cells, mononucleate and multinucleate, which have dark staining nuclei and infiltrate the tissues widely. Their origin from either layer of chorionic epithelium is not apparent, there being a marked variation in size, shape, and maturity of the cells. These component cell masses are held together by extensive hemorrhagic extravasations and necrotic tissue. The large amount of fibrin and blood is due to the peculiar ability of syncytium to invade blood vessel walls, disintegrating their continuity and leading to hemorrhagic extravasation. The extensive amount of necrosis in the tumor cells is the result of rapid proliferation of tissue without adequate blood supply. The tumor tissue is truly parasitic in that it lacks a stroma of its own and a blood supply of its own, surviving and proliferating by its ability to tap the host's circulation for sustenance. Because of these characteristics, tumor nodules can, and probably do, become completely encapsulated by necrotic tissue, fibrin, etc., thereby losing their source of blood supply and undergoing complete necrosis. This may explain the rare cases of cure in inoperable cases reported in the literature.

Chorionic epithelium probably elaborates the so-called anterior pituitary-like hormone which is responsible for the hormonal test of pregnancy. Where there is present such a pathologic overgrowth of chorionic epithelium as seen in chorionepithelioma, the hormonal excretion in the urine and its concentration in the blood should be very high. The high concentration of this hormone in the urine offers an excellent diagnostic test for the presence of this tumor; the continued presence of the hormone indicates a lack of complete eradication; its recurrence likewise indicates metastatic growths. Thus the character of the growth itself has provided us with the best diagnostic aid for the recognition of the primary tumor and a warning signal for possible recurrences and metastases. Several weeks after complete disappearance of chorionic epithelium the pregnancy test becomes negative and remains so.

SUMMARY

Ninety out of 1,000 postpartum cases were studied regarding the effect of camphor-in-oil on the breasts at various periods following delivery. When given within twenty-four hours after delivery, 80 per cent of the patients failed to develop breast engorgement. When given after twenty-four hours and before engorgement developed beyond the first degree stage, inhibition took effect within six hours and the breasts returned to the normal state shortly thereafter.

When the breasts exhibited a second degree reaction before treatment was instituted, the use of camphor-in-oil prevented extension of engorgement to the third degree stage. When camphor-in-oil was given after the breasts reached the second or third degree reaction, the duration of breast engorgement was shortened to twelve hours instead of thirty-six hours. Furthermore, regression to the nonlactating phase was complete within two to three days instead of the usual four to five days. It is therefore evident that the earlier the injections are started, the less the degree and duration of the engorgement, and the quicker the breasts return to their dry state.

Since the writing of this paper, 50 additional patients have been given larger doses of camphor-in-oil (3 gr. twice during first day) with results that seem to be more effective in prevention of lactation.

CONCLUSIONS

1. Intramuscular camphor in oil is an effective method of treatment for relief of breast engorgement.
2. Camphor-in-oil given intramuscularly was found to inhibit lactation.
3. The sooner the injections are started postpartum, the more effective is the action.
4. No marked general or local reactions followed.
5. The advantages of this method over binders, catharsis, sedation and restriction of fluid intake, are that it is more effective, simpler and less disturbing to the patient.

I wish to express my thanks to Dr. Harry Aranow, Director of Obstetrics, and to Dr. Abraham Tamis for his valuable advice and help in planning this paper.

REFERENCES

- (1) *Rosenblatt, J.*: Zentralbl. f. Gynäk. 46: 1523, 1922. (2) *Philpott, N. W.*: Canada Med. J. 20: 494, 1929. (3) *McNeile, L. G.*: Western J. Surg. Obst. & Gynec. 43: 61, 1935. (4) *Liegner, B.*: Zentralbl. f. Gynäk. 57: 244, 1933.

168 ST. GERARD AVENUE

time was positive. Because of the fact that the corpus of the uterus was enlarged to the size corresponding to the duration of the amenorrhea a diagnosis of an intra-uterine gestation, possibly with a fibroid tumor complicating it, was considered most likely.

The latter part of June the patient began to bleed more profusely. She developed rhythmic contractions in the lower abdomen resembling labor pains. She likewise developed cough and fever. She was hospitalized and medical induction was attempted. She continued to bleed profusely and her temperature rose to 104° F. She had several chills. During this time she passed several large, foul-smelling blood clots.

When the author saw the patient for the first time she had been in labor for several days. At this time she was in active labor, good strong pains recurring every two or three minutes. There was a continuous bloody discharge from the



Fig. 2.

Fig. 2.—A section of the normal placenta. (X22)



Fig. 3.

Fig. 3.—Chorionepithelioma. A mass of syncytium. (a) Note the large mass of multinucleated cytoplasm—greatly vacuolated. (b) Hemorrhage. (X450)

Department of Reviews and Abstracts

CONDUCTED BY HUGO EHRENFEST, M.D.

Selected Abstracts

Endocrinology

Pende, Nicola: Clinical Classification of Endocrine Diseases, *Vestnic Endocrinologii* (Moskow) 4: 355, 1934.

The author suggests the following classification of endocrine diseases in accord with varied syndromes of symptoms: (1) Endocrine temperaments and subendocrinopathic conditions, dependent on hereditary constitution in the majority of cases. (2) Latent and compensated endocrinopathies, representing serious damage of endocrine glands which temporarily does not become actively manifested. Pathologic anatomy and secretory activity do not go parallel. (3) Dissociated, partial and paradoxical endocrinopathies, in which affection of endocrine gland may remain latent or manifests itself in various characteristic symptoms, but at the same time other symptoms may be absent or cause contradictory phenomena. (4) Complete endocrinopathies, i.e., distinctly pronounced afunctional or hypo- and hyperfunctional syndromes. (5) Compound endocrinopathies manifesting themselves in the immediate action of altered endocrine function upon various organs. (6) Associated or pluriglandular endocrinopathies, in which endocrine syndromes are a composite of the syndromes of several affected endocrine glands. (7) Endo-exocrine syndromes as, e.g., in the cases of Mikulicz's disease where a hypertrophy of salivary and lacrimal glands occurs with hypoadrenalism and hypogenitalism. (8) Neuro-endocrinopathic and psycho-endocrinopathic syndromes. On the basis of this category the author dwells upon functional unity of the endocrine apparatus and the neurovegetative system.

ALEXANDER GABRIELIANZ.

Pavlenko, S. M.: The Question of Endocrine Correlation, *Vestnic Endocrinologii* (Moskow) 4: 198, 1934.

Not a single existing scheme of the correlation of the endocrine glands has any value because many glands produce several hormones, responsible for varying reactions of the organism. There is no constancy in antagonism and synergism of the glands. Two endocrine glands may be antagonists or synergists depending on the age of the individual; e.g.: Hyperfunction of the thyroid leads to hypofunction of gonads in adults, while in childhood hypofunction of the thyroid causes underdevelopment of the gonads. Furthermore, in adults, hypofunction of the gonads may be due not only to hyperfunction of the thyroid, but to hypofunction as well. The author asserts that many endocrine disturbances are not directly dependent on disturbed function of endocrine glands in regard to quality or quantity of the secreted hormone, but represent pathologic reaction of the peripheral organ in its response to hormonal influence. Only on this basis

broad ligament and cervix, tumor tissue could be seen infiltrating the structures throughout. It was entirely impossible to consider removal of the cervix because of the extent of the growth. Bleeding was controlled and the stump peritonized.

Following the operation she had a stormy course for a week or so, after which she improved daily. The temperature and pulse subsided rapidly to normal. She had some slight vaginal bleeding of little consequence. Radiation was started on August 1, twelve days postoperatively. It was continued with only slight interruptions for thirty-seven days. She was finally discharged from the hospital on her fifty-fourth postoperative day.

During a period of six weeks the patient received 11 transfusions totaling 7,000 c.c. of blood. Thus her total blood volume was replaced about $1\frac{1}{2}$ times. The lowest hemoglobin content was 4 gm. per kilogram of body weight on July 16.

Aschheim-Zondek tests were markedly positive throughout the course of this disease. The first negative test occurred on Sept. 7, 1934. Since that time frequent tests have proved to be negative, the quantitative amount of anterior pituitary-like



Fig. 6.—Chorionepithelioma. The wall of the venous channel has been largely replaced by invading chorionic tissue showing the tendency of chorionic epithelium to invade the circulation. ($\times 225$)

hormone being carefully determined biologically. The following is a record of the Aschheim-Zondek tests. The hormone was separated from the urine by the Zondek precipitation method.

tracts and the hypophysis of the infantile rat, which is able to stimulate the hypophysis of the host to increased hormone production. The difficulties of determining the hormone content of any preparation are thus increased, since this can be done accurately only when the animal's own hypophysis is removed.

W. B. SERBIN.

Young, A. M.: Observations on the Technic of the Friedman Test for Pregnancy, J. Lab. & Clin. Med. 19: 1224, 1934.

In a series of 350 Friedman tests for pregnancy, Young obtained the following results: 92 true positives in uterine pregnancy; 2 positives in intact ectopic pregnancy, and 1 in hydatid mole. There was one false positive. There were 131 true negatives in which 69 had no pelvic pathology and 79 had various types of pelvic disease. One male urine was used which gave a negative test; there were five doubtful early tests. There was one false negative and 114 tests were experimental. The earliest positive test in the series was thirty-two days after the last menstrual period.

The author recommends the following procedures in carrying out the Friedman test: Selection of ordinary mature domestic female rabbits weighing from 2 to 4 kg.; isolation of animals in individual cages; use of morphine sulphate gr. $\frac{1}{2}$ to gr. 2 intravenously as an anesthetic; preliminary laparotomy and inspection of ovaries with selection of animals with ripe or nearly ripe follicles but no corpora hemorrhagica or corpora lutea; intravenous injection of 15 c.c. of clear, filtered, first morning specimen of urine, warmed to body temperature, sp. gr. of 1.015 or higher, the dose repeated in about four hours. Forty-eight hours after the first injection the wound is opened and the ovaries are reinspected. If ovaries are grossly positive, one ovary is removed and examined microscopically by frozen section. The presence of lutein tissue in the wall of one or more follicles associated with some hemorrhage into the follicle constitutes an undoubtedly positive reaction. If the ovaries have no corpora hemorrhagica the wound is closed and the rabbit injected with 15 c.c. of known positive urine or concentrated urine and forty-eight hours after the injection of the positive control urine the wound is opened and the ovaries are reinspected. If the ovaries now contain corpora hemorrhagica and lutein tissue, the final report of a negative test with the urine for diagnosis is given. If facilities are not available for making frozen sections, a reinspection of the ovaries on the fifth or sixth day after injection will show sufficient lutein tissue grossly to make a positive diagnosis.

W. B. SERBIN.

Pratt, J. P.: The Human Corpus Luteum and Progesterin, Endocrinology 18: 667, 1934.

Two hormones have been extracted from the corpus luteum of animals, the estrogenic substance and progesterin. The presence of progesterin, first extracted from the corpus luteum of the sow, has not been demonstrated in many species.

The author investigated its presence in corpora lutea removed at operation. A total of 131.5 gm. was thus obtained and the Corner-Allen method of extraction used. The assay of the human material was paralleled by similar product from the sow. In the sow, tests for progesterin are positive in 20 ± 5 gm. of material. The human material gave negative results up to 40 gm. These experiments indicate that progesterin is not as plentiful in human as in hog corpora lutea or that its presence is confined to certain periods in the menstrual cycle not yet determined.

J. THORNWELL WITHERSPOON.

Usually, chorionepithelioma arises at the site of the placenta, probably because of the marked chorionic proliferation normally present in this region. A number of cases have been reported in which the only growth discovered was present in the vagina or on the labia or in some distant organ. It was always felt that these tumors represented metastatic foci from a primary growth in the uterine cavity. The site occupied by this growth, some distance from the normal placenta, would indicate that chorionic epithelium could undergo abnormal proliferation in any locality provided that the stimulus for abnormal growth was present.

TREATMENT

The treatment of this case is interesting. Too few of these cases are seen in any one clinic to allow the development of a standard therapy. The treatment of every case adds to the accumulated knowledge. It has long been the impression of those interested in radiation therapy that chorionepithelioma should rank among the most radiosensitive neoplasms because of its rapid growth and embryonic cell type. In the recent literature there are a few reports of the irradiation treatment of chorionepithelioma carried out in conjunction with operation. All observers are agreed that following irradiation the visible or palpable tumor masses regressed very rapidly.

The roentgenotherapeutic technic employed in the case cited above was as follows:

Voltage 200,000	Ma. 3	Filter 1½ mm. Ca + 2 mm. Al.
Focal skin distance 50	cm.	

Four pelvic portals 15 by 15 cm. were demarcated, the beam directed through each portal to converge upon the site of the uterus and upper vagina.

A fifth perineal post, 15 by 15 cm., with the beam directed upward into the pelvis was also employed after the irradiation through the pelvic portals was completed.

One treatment a day per portal was given, the dose being 242 r. measured in air. The pelvic portals were treated in rotation until each portal had received a total of eight treatments. The series was then completed by three treatments of 242 r. each to the pelvic portal.

was reached during the middle of the interval phase, a secondary rise occurred at the time of the flow, and it was diminished just before and after menstruation.

J. THORNWELL WITHERSPOON.

Ferringo, P.: Estrogen Elimination in Women With a Normal Sexual Cycle and in Women Affected by Amenorrhea, *Clin. obstet.* 37: 129, 1935.

The maximum elimination of 300 rat units per 1,000 c.c. of urine was found in a woman with a normal sexual cycle. The moderate elimination of 170 rat units per 1,000 c.c. of urine in twenty-four hours occurred in a woman during the menopause. The minimum elimination of 100 rat units per 1,000 c.c. of urine in thirty-six hours was observed in a woman with amenorrhea.

AUGUST F. DARO.

Marx, Rudolph: Influence of Hysterectomy on Endocrine Balance, *Am. J. Surg.* 28: 117, 1935.

Suggested by the hypothesis of Sessums and Murphy, that ovarian conservation after hysterectomy delays the onset of the menopause and diminishes its unpleasant symptoms, the author offers additional observations indicating that the uterus is not only an organ of reproduction but that it plays an important part in the regulation of the endocrine balance during the period of sexual maturity. He suggests that the ovarian-uterine hormonal reaction is not altogether one-sided, from ovary to uterus, but that the endometrium also secretes a hormone which acts upon the ovary. Hence, the ideal clinical relation after hysterectomy is to conserve sufficient endometrium, with one or both ovaries, to preserve this ovarian-uterine hormonal balance.

J. THORNWELL WITHERSPOON.

Ellison, E. T., and Wolfe, J. M.: The Effect of Castration on the Anterior Hypophysis of the Female Rat, *Endocrinology* 18: 555, 1934.

Studies were made on the pituitaries of 100 female rats from which the ovaries had been removed at various intervals (5-500 days) before they were sacrificed. It appeared that there is a quantitative increase in the percentage of basophile cells until about the thirtieth day of castration. After this period there is a gradual decrease of these elements. There is a moderate increase in the percentage of eosinophile cells during the first sixty days of castration. Later they tend to decrease in number. There is no morphologic change in the chromophobe type of cell after castration.

J. THORNWELL WITHERSPOON.

Damm, P.: Quantitative Examinations of Hormones in the Urine, *Acta obst. et gynec. Scandinav.* 14: 129, 1934.

Observations were carried out in regard to the amount of prolactin A in the urine of operatively castrated women at short intervals after the operation. At the same time the urine was examined with regard to the amount of folliculin contained in it, mostly with negative result. The amounts dealt with in the quantitative determination of prolactin A were so small that it was necessary to use the precipitation method. Prolactin A was already present about two weeks after castration. The hormonal examination was also carried out during folliculin treatment, which did not seem to influence the secretion of Prolactin A. This result, however, may be due to the small amount of folliculin given. The amount of folliculin secreted during the treatment shows a considerable deficiency, probably

STATISTICAL STUDIES ON PUERPERAL INFECTION

III. AN ANALYSIS OF 115 DEATHS DUE TO PUERPERAL INFECTION

C. H. PECKHAM, M.D., BALTIMORE, MD.

(From the Department of Obstetrics, the Johns Hopkins University and Hospital)

IN TWO preceding communications (this JOURNAL, 31: 435 and 582, 1936), the author presented in detail the results of a statistical survey of a large series of cases of puerperal infection and drew attention to certain factors influencing the frequency of this serious obstetric complication. Subsequently it seemed advisable to investigate in a similar manner a group of fatal cases of such infection in order to determine the mortality rates and to ascertain the presence of any factors having an unfavorable effect on the prognosis. The results of this study form the content of this paper which is based on the case records of 115 patients dying of puerperal infection on the Obstetrical Service of the Johns Hopkins Hospital from the time of its inception in 1896 to the end of 1930. In order that the series should be as complete as possible, we have included not only deaths occurring in those patients delivered at term or prematurely on the Hospital or Outdoor Services, but also all cases of abortion, as well as a number of women admitted because of clinical evidences of infection following delivery by some outside physician or midwife. Only those cases have been included in which the clinical cause of death seemed obviously to be infection; and in most instances the diagnosis was confirmed at autopsy.

Table I indicates the gross statistics of the series according to type of admission and also the mortality rates derived. The gross maternal mortality due to puerperal infection, and based on a total of 33,918 admissions, both hospital and home, was 0.339 per cent or 1 in 295 admissions. It will be noted that this rate is heavily weighted in the rubrics "admitted postpartum" and "deliveries, abortion." All of the former and most of the latter admissions were in patients who had never received antenatal care on the service but who came to the hospital or were referred to it by some outside physician because of an already existing abnormality, frequently infection. Emergency pa-

tropic hormone is secreted again and a new cycle is initiated. In the male the hypophysis is less easily influenced by gonad hormone with the result that apparently it is never suppressed to the extent that the male reproductive functions exhibit cyclic characteristics.

J. THORNWELL WITHERSPOON.

Zondek, B.: Primary Polyhormonal Amenorrhea With Glandular Cystic Hyperplastic Endometrium, *Acta obst. et gynec. Scandinav.* 13: 309, 1934.

Zondek's earlier investigations showed that both amenorrhea and hemorrhage may be the result of the same functional process, namely, a too strong and protracted production of follicle hormones (folliculin). Those observations led him to the idea of polyhormonal pathologic syndromes. In the chain of proof there was still a link missing, however. It had not yet been proved that the mucosa of the uterus showed the same changes in the case of amenorrhea as in the case of hemorrhage. Zondek now describes a case of primary polyhormonal amenorrhea with persisting follicle, highly increased secretion of folliculin, and glandular-cystic-hyperplastic uterine mucosa. Hence the same anatomic change can be found in the case of amenorrhea as in the case of polyhormonal hemorrhage (metropathia hemorrhagica).

J. P. GREENHILL.

McClellan, G. S., Phelps, Doris, and Burch, J. C.: Endometrial Studies, *Endocrinology* 19: 321, 1935.

Three series of experiments dealing with the interpretation of human endometrial change in terms of ovarian activity are reported. These include histologic studies of the normally menstruating and the bleeding hyperplastic endometrium; the relation of endometrial growth, blood and urine estrin and bleeding periods in a case of endometrial hyperplasia; and the effect exerted on the endometrium of a castrated woman by injections of estrogenic and corpus luteum hormones. Specimens of endometrium in all cases were obtained by the punch biopsy method.

The histologic characteristics of 35 specimens of normally menstruating endometrium were compared with those of 25 typical specimens of bleeding hyperplastic endometrium. The former is characterized by progestational changes, evidence of degeneration with no evidence of active, vigorous growth, and by relatively little hemorrhage and no edema. The tissue consists chiefly of the basal layer. The bleeding hyperplastic endometrium is characterized by every evidence of vigorous growth and by considerable hemorrhage and edema. It shows no progestational changes, and the tissue is chiefly from the upper layers.

In a case of endometrial hyperplasia, weekly biopsies were obtained over a period of two months. Specimens of blood and urine, taken on the days biopsies were obtained, were assayed for estrin content. The so-called "Swiss-cheese" pattern was found in specimens taken near the beginning of the observation period but was not found in later specimens. In the interval between bleeding periods and near the onset of the latter, the greatest evidence of endometrial growth was found. The level of blood estrin was highest during these intervals and showed a decline before the onset of the succeeding period of bleeding.

A castrated woman, aged forty years, was given a series of injections of estrogenic and corpus luteum hormones over a period of one month. A total of 5 intramuscular injections of 50,000 M.U. each, administered twice weekly, of estrogenic hormone was followed by 5 daily injections of 10 rabbit units each of corpus luteum hormone. Administration of the latter was begun 4 days after the last injection of estrogenic hormone. Weekly biopsies were taken throughout the experiment. The estrogenic hormone provoked a mild growth of the endometrium.

for the fatal outcome in only a tenth; while septicemia occurred in 35 per cent and was the sole factor in 24 per cent of the series. In a few isolated cases the lesion, although clinically puerperal sepsis, could not be accurately determined; and since autopsy was not obtained these deaths have been listed as "type not clear."

By way of further analysis of these fatal instances of puerperal infection certain items have been obtained from the case records and comparisons made between the total deaths and deaths due to peritonitis, septicemia, or thrombophlebitis. Moreover, for purposes of comparison, the 500 cases of puerperal infection analyzed in the second article of this series have been included and, as a normal control, the general clinic population. The following factors have been selected for analysis and comparison: (The percentages to be presented include only those patients dying after a pregnancy of seven or more months' duration. The abortion figures will be presented elsewhere.)

1. *Race, Age, and Parity.*—It has frequently been pointed out that the incidence of puerperal infection is higher in the black than in the white race. Table III indicates further that the prognosis in this condition is somewhat more serious in the black patients since they disproportionately outnumber the whites even more in the fatal cases of puerperal infection than in the nonfatal ones. There is also a peculiar racial difference according to cause of death, four-fifths of the fatalities due to peritonitis and thrombophlebitis occurring in the black race, while more than half of the fatal septicemias occurred in white patients. Table III would also seem to demonstrate that puerperal

TABLE III. DEATHS AT OR NEAR TERM

	TOTAL CLINIC POPULA- TION	500 CASES INFECTION	DEATHS INFECTION	DEATHS PERITONITIS	DEATHS SEPTICEMIA	DEATHS THROMBO- PHLEBITIS
	PER CENT	PER CENT	PER CENT	PER CENT	PER CENT	PER CENT
<i>Race:</i>						
White	47.75	38.40	34.85	21.43	52.91	20.00
Black	52.25	61.60	65.15	78.57	47.06	80.00
	YEARS	YEARS	YEARS	YEARS	YEARS	YEARS

content in the blood and in two an inconstant prolactin secretion in the vomitus. At the time the vomiting ceased there was a rise in the prolactin content of the urine in three cases and a fall in the prolactin content of the blood serum in two. In control cases the urine and blood serum of pregnant women showed normal prolactin contents.

J. P. GREENHILL.

Dworzack and Poleschka: The Hormonal Functions of Granulosa Cell Tumors, *Arch. f. Gynäk.* 154: 441, 1933.

Hypertrophy of the endometrium and myometrium together with metrorrhagia and breast hypertrophy are frequently found with granulosa cell tumors. The endometrial change is usually a glandular cystic hyperplasia and is practically always present. Occasionally a decidua-like change is found. Such changes must be due to hormonal activity of these tumors. The authors were unable to find any definite anterior hypophysis reaction but found that the elimination of the follicular hormone jumped from 2 to 3 units per liter of urine during the intermenstrual period of 50 units per liter when granulosa cell tumors were present. Such a hyperhormonal state produces the uterine enlargement and the endometrial hyperplasia. The corpus luteum hormone is also probably produced, since there is occasionally a decidua formation.

The authors believe that it will soon be possible to diagnose granulosa cell tumors before operation. They believe that frozen sections should be made whenever this type of tumor is suspected or diagnosed during operation, in order that a radical operation may be performed if this type of tumor is diagnosed. The question of recurrences following operation and postoperative irradiation can be determined by examinations for the hormones produced by the tumor.

RALPH A. REIS.

Bergstrand, H.: The Nature of Virilizing Ovarian Tumors, *Acta obst. et gynec. Scandinav.* 13: 336, 1934.

The author describes ovarian tumors in 4 cases of hirsutism from his own series and he also microscopically examined the two cases reported by Berner and Strassmann. In two of his own cases he proved the growth to be a folliculoma or a granulosa cell tumor, especially as the strands of tumor cells form bodies resembling atretic follicles. On the basis of these two cases, he made a histologic analysis of the four others, and came to the conclusion that they are fundamentally of the same nature. In one of them, he found an unmistakable ovum in the center of the large mass of malignant tumor tissue. Besides ovarian elements, granulosa and lutein cells, cysts lined with columnar epithelium and containing mucus occurred in 3 cases. In 2 cases these cysts were quite distinct from the ovarian elements of the tumor. He therefore considers these tumors to be a combined malformation of the germinal epithelium of the mesonephros and of Wolff's duct or Mueller's duct. From the clinical point of view it is interesting to note that these tumors, which microscopically are shaped like ovaries, often show mitosis and other signs of rapid growth, but nevertheless are as a rule clinically benign if removed in time. In one of the author's cases, however, the patient died from extensive metastases of the peritoneum.

The microscopic examination gives no clue whether the active hormone is produced by the granulosa or the lutein cells of the tumor. The investigations of Steinach and Kun, who in 1931 were able to demonstrate the virilizing effect on guinea pigs of corpus luteum extract, seem to indicate that this secretion is a function of the lutein cells.

3. *Intrapartum Infection*.—There is a tendency to consider only the immediate danger of intrapartum infection and to disregard its subsequent implications. Our figures indicate that frequently such a process progresses during the puerperium to a fatal issue. This may best be emphasized by three figures from Table V indicating an inci-

TABLE V. INTRAPARTUM INFECTION

	TOTAL CLINIC POP- ULATION	500 CASES IN- FECTION	DEATHS IN- FECTION	DEATHS PERITO- NITIS	DEATHS SEPTI- CEMIA	DEATHS THROMBO- PHLEBITIS
<i>Intrapartum Inf.</i> Per cent of total delivered	3.82%	9.36%	34.85%	23.81%	58.33%	100.00%

dence of intrapartum infection of 3.82 per cent in the general clinic population, one of 9.36 per cent for the group of patients with puerperal infection, and one of 34.85 per cent in the series of deaths.

4. *Uterine and Blood Cultures*.—Table VI shows the incidence of pathogenic organisms obtained from 771 positive intrantrine cultures taken as a matter of routine in cases of puerperal infection, which may be contrasted with results similarly obtained in the fatal cases of infection. It will be noted that almost half of the streptococci in the death column are listed as "undifferentiated" and it should be explained that these cases occurred in the earlier days of the Clinic when crude bacteriologic technic did not offer an exact method of differentiation. Table VI emphasizes the serious import of intrauterine

TABLE VI. UTERINE CULTURE. PERCENTAGE OF TOTAL CULTURES
(SEVEN HUNDRED SEVENTY-ONE POSITIVE CULTURE REPORTS)

	PUERPERAL INFECTION	DEATHS INFECTION
Hemolytic strep.	8.56	25.64
Aerobic nonhemolytic strep.	26.20	7.69
Anaerobic strep.	42.80	10.26
Undifferentiated strep.	0.00	38.36
<i>Strep. viridans</i>	1.17	2.56
Total strep.		78.73
<i>Staph. albus</i>	26.07	10.26
<i>Staph. aureus</i>	3.25	12.82
Total staph.		29.32
<i>B. coli</i>	9.68	17.95
<i>B. welchii</i>	0.65	15.28
<i>Genococcus</i>	1.23	2.56

which is excreted. (2) Estimation of the rate of excretion of ovary-stimulating hormone should be based upon measurement of the hormone in the urine that is passed in a twenty-four-hour period, and not upon the amount in a smaller sample of urine.

WILLIAM C. HENSKE.

Books Received

POST-GRADUATE SURGERY. Edited by Rodney Maingot, Senior Surgeon of the Royal Waterloo Hospital and Southend General Hospital. Volume I, with 846 figures in the text, 1,742 pages. D. Appleton-Century Company, New York, 1936.

CLINIQUES OBSTÉTRICALES, par L. Devraigne, chargé de cours de clinique annexe de la faculté de médecine de Paris. 240 pages. G. Doin & Cie, éditeurs, Paris, 1936.

ANNUAL REPORT for the year 1933 of the Minneapolis General Hospital. Published in 3 parts.

CHILD PSYCHIATRY. By Leo Kanner, M. D., Associate Professor of Psychiatry, Johns Hopkins University. Pp. 527. Published by Charles C. Thomas, Springfield, Ill., 1935.

PEDIATRIC NURSING. By John Zahorsky, M.D., Professor of Pediatrics and Director of Department of Pediatrics, St. Louis University School of Medicine, etc. With 144 illustrations in the text and 7 color plates, 568 pages. The C. V. Mosby Co., St. Louis, 1936.

AN INDEX OF DIFFERENTIAL DIAGNOSIS OF MANY SYMPTOMS. By various authors, edited by Herbert French, Consulting Physician to Guy's Hospital. Fifth edition, with 742 illustrations of which 196 are colored, with 1145 pages. William Wood & Co., Baltimore, 1936.

LA SINFIOTOMIA EN ESPAÑA. Por Dr. Angel Guerrero Abellan, Barcelona, 1936.

ABORTION, SPONTANEOUS AND INDUCED. Medical and Social Aspects. By Frederick J. Taussig, M.D., Professor of Clinical Obstetrics and Gynecology, Washington University School of Medicine. 536 pages. Illustrated. The C. V. Mosby Co., St. Louis, 1936.

A TEXTBOOK OF OBSTETRICS. For Students and Practitioners. By Frederick C. Irving, M.D., Professor of Obstetrics, Harvard Medical School; Visiting Obstetrician, Boston Lying-In Hospital. 558 pages. The Macmillan Company, New York, 1936.

LEHRBUCH DER GEBURTSHILFE. Von Dr. Rud. Th. v. Jaschke. Vierte Auflage, mit 573 zum Teile farbigen Abbildungen. 770 Seiten. Verlag von Julius Springer, Berlin, 1935.

MEDICAL PAPERS. Dedicated to Henry Asbury Christian, physician and teacher, from his present and past associates and house officers at the Peter Bent Brigham Hospital, Boston, Mass. In honor of his sixtieth birthday, Feb. 17, 1936.

SUMMARY AND CONCLUSIONS

Since the opening of the Obstetrical Department of the Johns Hopkins Hospital in 1896 to the end of 1930, there have occurred 115 deaths due to puerperal infection. In the foregoing paragraphs a statistical analysis of these cases has been presented demonstrating certain mortality rates and indicating various factors obtained from the case records which seemed to affect the ultimate prognosis. The following summary gives the main positive findings.

1. In a series of 33,918 patients the death rate due to puerperal infection was 0.339 per cent or 1 in 295 admissions. The majority of these deaths occurred either following abortion or delivery at term by some outside agency, the patient already showing evidence of intra-uterine infection at the time of admission. A much lower mortality rate occurred in those registered patients delivered by the service at or near term. This fatal infection rate may be termed the Clinic responsibility and was 0.106 per cent or 1 in 943 deliveries.

2. Peritonitis was the immediate cause of death in approximately three-fifths of these fatal cases, while septicemia accounted for a quarter, and thrombophlebitis a tenth of the total.

3. Puerperal infection, according to our experience, has a more ominous prognosis in black as contrasted with white women. Four-fifths of the deaths due to peritonitis and thrombophlebitis occurred in the colored patients, while whites predominated in the septicemia group.

4. Although puerperal infection occurred most frequently in primiparas and women of the younger age groups the mortality was highest in multiparas and those of greater age.

5. Although the incidence of operative delivery for the Clinic was only 17 per cent, more than half of the fatal cases of puerperal infection followed some type of operation. Cesarean section had been performed in 23.4 per cent of the total deaths, although in most instances these patients were admitted with obstructed labor and intrapartum infection following care by some outside agency. Seventy-two per cent of the deaths occurring in registered patients followed spontaneous delivery. A policy of conservatism, together with scrupulous regard for surgical principles when operative manipulation becomes necessary, offers, in our experience, the best results.

American Journal of Obstetrics and Gynecology

VOL. 31

JUNE, 1936

No. 6

Original Communications

EXCESSIVE UTERINE BLEEDING OF FUNCTIONAL ORIGIN*

LEO WILSON, M.D., AND RAPHAEL KURZROK, M.D., PH.D.,
NEW YORK, N. Y.

(From the Department of Obstetrics and Gynecology, the College of Physicians and Surgeons, Columbia University; the Sloane Hospital for Women; and the Morrisania City Hospital)

FUNCTIONAL uterine bleeding is excessive bleeding due to a disturbance in the hormonal mechanism that controls normal menstruation. Excluded from this category are such organic and constitutional conditions as uterine and ovarian tumors, abortion and ectopic pregnancy, salpingitis, endometritis, hydatidiform mole and chorionepithelioma, and certain blood dyscrasias in which uterine bleeding is a prominent symptom. The disorder known as follicle cytosis of the ovary due to repeated failure of ovulation is, however, included in the functional group.

Since menstruation is by nature an endocrine phenomenon, it is to be expected that functional menstrual disorders (of which bleeding is one) are more likely to occur at those times in a woman's life when her endocrine system suffers the greatest stress and strain, namely: at puberty, after pregnancy, and in the preclimacteric period. They may, however, develop at any time during the childbearing age.

*This work was supported by a grant from E. R. Squibb & Sons.

Read at a meeting of the Section on Obstetrics and Gynecology of the New York Academy of Medicine, April 28, 1936.

aim should be, first, to clean mechanically the body surface without irritation and, second, to protect that surface from bacterial invasion. If this protection can be given by means of some application which does not injure nor irritate the infant's skin, we feel that the incidence of troublesome, not to say dangerous, cutaneous infections can be definitely reduced or prevented.

At the Orange Memorial Hospital various routines have been employed. Until 1927, babies were given an initial cleansing with olive oil followed by daily soap and water baths. Later, 5 per cent ammoniated mercury ointment was used following, in a general way, the suggestions of Chadwell.⁵ Finally, in 1933, a routine was adopted which has been in force since then. This consists of an initial, prepared soap bath, drying and completely anointing with 3 per cent ammoniated mercury ointment as soon after birth as possible. Each day following, during the entire stay in the hospital, the babies are oiled with a medicated, blended oil. No water is used after the initial bath.

During the period from March, 1931, to January, 1935, among 1,310 newborn babies, the total number of skin infections was 26 (0.019 per cent). Of this number, twelve (0.009 per cent) were impetigo. One baby was born with a single lesion, the remaining eleven were postnatal in origin. Table I shows the incidence of skin infections since the adoption of the present routine.

TABLE I. INCIDENCE OF SKIN INFECTIONS. MAY, 1933 TO MAY, 1935 (651 BABIES)

	CASES OF IMPETIGO	NONIMPETIGENOUS ERUPTIONS
1933	1	1
1934	3	3
1935	1	2
Total incidence, 0.016%; impetigo incidence, 0.007%		

Our comparative freedom from sporadic cases of impetigo and the absence of any recent epidemics has afforded us much satisfaction in, and reliance upon, the technic used. So satisfactory have been our results we were prompted to learn by experiment, if possible, the relative value, particularly the bactericidal value, of different applications made on the surface of the skin.

interesting fact of diagnostic value that when the menstrual period is associated with dysmenorrhea, the ovulation bleeding is free of all pain. Although ovulation bleeding is very common in monkeys, it occurs infrequently in women. It may appear suddenly, last a few months and then disappear; or it may persist for several years.

5. *Cyclical (Anovulatory) Bleeding*.—In recent years it has become increasingly evident that not all periodic bleeding is necessarily true menstruation. The latter requires the previous occurrence of ovulation, the formation of a corpus luteum and bleeding from a secretory endometrium. But periodic bleeding may also occur from a proliferative endometrium. It then represents an anovulatory cycle. This type of bleeding is associated with sterility, first because the failure of ovulation prevents the liberation of a mature ovum, and second, because the absence of the corpus luteum prevents the conversion of the proliferative endometrium into a pregravid (secretory) type.

MECHANISM OF BLEEDING

Our concept of the menstrual cycle was presented schematically in a previous paper published in this JOURNAL (29: 771). Estrin dominates the first half of the cycle and stimulates proliferation of the endometrium. Under normal conditions, ovulation occurs when the endometrium has been completely built up. The transformation of the ruptured follicle into a corpus luteum is due to the action of the luteinizing hormone and follows ovulation. The hormone of the corpus luteum dominates the second half of the cycle and brings about the formation of a secretory endometrium.

The actual cause of menstrual bleeding is not definitely known. Four possible factors may be considered, namely, the myometrium, the endometrium, the ovary, and the anterior pituitary gland.

A. The *myometrium*, at first thought, might appear to be of importance in controlling menstrual bleeding because of the rôle the uterine muscle plays in checking postpartum hemorrhage. It is, of course, true that the development and maintenance of the myometrium are dependent upon the follicular hormone. However, in cases of uterine hypoplasia, amenorrhea rather than menorrhagia is the rule. This is because ovarian hypofunction is usually the common underlying factor in both uterine hypoplasia and amenorrhea. Occasionally, uterine hypoplasia is associated with excessive bleeding but here the fault may lie in the inability of the myometrium to respond to an otherwise adequate ovarian stimulus. While uterine bleeding may, at times, be temporarily diminished by the administration of oxytocic drugs (pituitrin, ergot), there is no evidence to support the view that the primary or major cause of the bleeding is a failure of contractility.

B. The *endometrium* demands careful consideration not only because it is the site of the bleeding but also because it reflects the activity of the ovaries. Examination of the endometrium has been facilitated by the use of a modified Klingler-Burch (1932) suction curette (Fig. 1). By this method it is possible to obtain specimens of endometrium at

The similarity between the graphs of Series 1 and 2 is striking. Although in neither is "group sterility" of the skin obtained, there is considerable reduction in the number of surface bacteria on those parts of

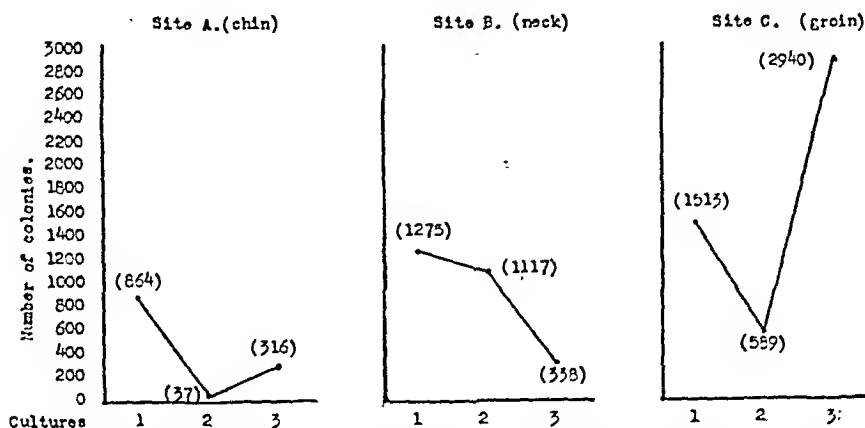


Fig. 1.—Composite graph of bacterial colonies. First series, 14 cases. Cleansing agents in Series 1: soap bath, ammoniated mercury, and medicated oil.

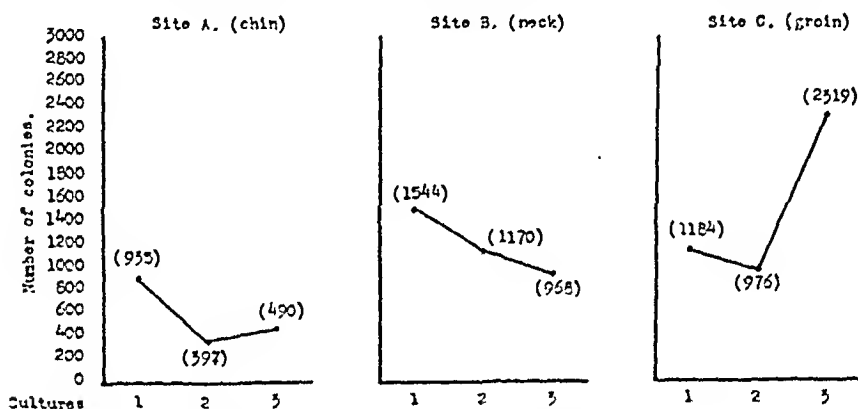


Fig. 2.—Composite graph of bacterial colonies. Second series, 24 cases. Cleansing agent in Series 2: medicated oil.

Anspach and Hoffman (1934) previously reported that there was no single type of endometrium constantly associated with either functional bleeding or amenorrhea. The following case reports completely confirm their view:

CASE 1.—*Anovulatory Bleeding—Proliferative Endometrium.*—H. N., aged thirty-three, para ii, last pregnancy 1925. Menses regular from onset at thirteen years until 1932 when alternating amenorrhea and polymenorrhea ensued. Biopsies during bleeding and amenorrheic stages always showed a proliferative type of endometrium (Fig. 2, A). An endometrial specimen taken while the patient was bleeding after a two months' period of amenorrhea showed cystic dilatation of the glands (Fig. 2, B). The latter is explained on the basis of prolonged and unopposed follicular hormone action.

CASE 2.—*Puberty Bleeding—Cystic and Glandular Hyperplasia.*—J. L., aged nineteen, single, onset of menses at fifteen years, cycle always irregular varying from a two to six weeks' interval with a profuse flow of from four to ten days' duration. Patient bled profusely and continuously from Dec. 5, 1932, to Jan. 10, 1933, and the hemoglobin dropped to 40 per cent. Urine examination showed no follicular or follicle-stimulating hormones. Curettage revealed cystic and glandular hyperplasia of the endometrium (Fig. 3, A). The bleeding stopped after intensive pregnancy urine extract therapy (Follutein—Squibb*). Five blood transfusions were necessary to combat the anemia. There was no bleeding for eight months when another short episode of profuse bleeding ensued. This was readily controlled again by the gonadotropic fraction of pregnancy urine (follutein) and the treatment was continued for three months after the bleeding had stopped. There has been no bleeding since (eighteen months). A biopsy taken after fourteen months of amenorrhea revealed the persistence of the cystic and glandular hyperplasia. Urine examination at the same time showed no follicular hormone but the presence of follicle-stimulating hormone. Klingler and Bureh (1933) and Roek (1935) have noted that a secretory endometrium failed to develop after the bleeding was stopped by the administration of pregnancy urine extract. Thus, the cessation of the bleeding cannot be attributed to luteinization.

CASE 3.—*Continuous Bleeding for Eleven Years—Cystic and Glandular Hyperplasia.*—C. P., aged twenty-four, menses began at thirteen years, patient bleeding continuously ever since. The bleeding varies from a profuse flow to staining but the patient is never entirely clean. Hemoglobin 65 per cent. No pregnancies although married three years. Patient was curetted three times in the past four years because of the profuse bleeding. The endometrium has persistently shown marked cystic and glandular hyperplasia. The patient was given daily intravenous injections of prephysin† (1 to 2 c.c.) for twelve days beginning July 8, 1935. No bleeding since July 23, 1935, except for slight staining from Oct. 12, 1935, to Oct. 17, 1935. Biopsy during the amenorrheic phase (Sept. 17, 1935) shows the persistence of the cystic and glandular hyperplasia (Fig. 4, B). The cessation of the bleeding following intravenous anterior pituitary extract cannot, therefore, be attributed to luteinization. Incidentally, this patient had a severe and persistent facial acne which spontaneously disappeared soon after the bleeding stopped.

CASE 4.—*Maturity Bleeding—Cystic and Glandular Hyperplasia.*—M. P., aged thirty-three, married twelve years, never pregnant. Onset of menses at fourteen

*We are indebted to Dr. J. J. Durrett of E. R. Squibb & Sons for his generosity in supplying us with the follutein used in the treatment of our patients.

†We are indebted to Dr. A. E. Meyer of the Chappel Brothers Laboratory, Rockford, Ill., for his generosity in supplying us with prephysin. This preparation contains the gonadotropic hormones from the anterior hypophysis (1 c.c. = 25 R.U.)

cultured. The colonies, in many instances, reached a considerable number—as many as 5,000 to 6,000 were present on numerous plates.

Reducing the group findings to an average, individual basis, gives the results shown in Figs. 4, 5, and 6. These curves were plotted because of the unequal number of cases in the three series.

The curves in these graphs follow the same general course as corresponding curves in Figs. 1, 2, and 3. In Fig. 4, the graph for Series 1, in which ammoniated mercury was used, we find a reduction in the number of colonies, after its use, of 53 per cent. Following this, at the time of the next culture, there is an increase in the number of colonies of over 100 per cent. In Fig. 5, showing the results in that group where only the medicated oil was used, although the reduction in the number of colonies from the original count was but 32 per cent, the increase following this was only 34 per cent. The total number of bacterial colonies on babies in this group, not including the original count over which we had no control, was 32 per cent less than those found on infants in the first group. It is reasonable to conclude that, of the two procedures, the routine which employs medicated oil alone better inhibits the growth of bacteria on the skin of infants. If, as Gandy⁴ has reported, ammoniated mercury ointment is objectionable, the use of this unguent as a bacterial inhibitor is not necessary if medicated oil is used.

The graphs in Fig. 6 need scarcely be considered since they, like those in Fig. 3, show a steady increase in the bacterial count. It indicates clearly that cotton seed oil has no value, other than a mechanical cleansing agent, as a preparation to prevent or inhibit the growth of bacteria on the skin surface.

The organisms cultured were practically all staphylococci and *B. coli*. Occasionally a spore-forming organism was grown. Both staphylococci and *B. coli* were found, at various times, on all three areas at birth. On subsequent cultures, when bacteria were grown, the staphylococcus predominated on the chin and neck while *B. coli* was most common on the groin.

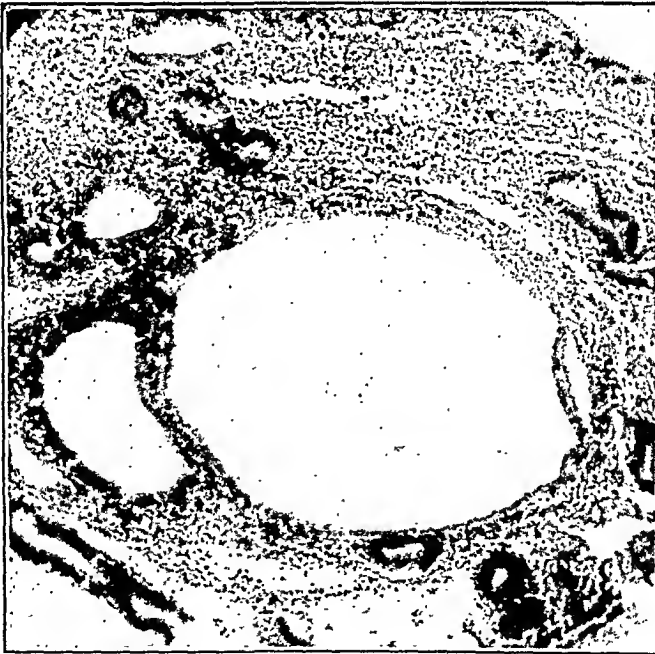
No cutaneous lesions occurred on any of the infants studied, and it is apparent that the mere presence of bacteria on the skin is not the only factor predisposing to skin infections. Whatever other considerations may be involved (and we recognize that many are), the use of some cleansing substance or agent capable of reducing the number, or inhibiting the growth, of surface bacteria is desired.

In considering the length of labor, the time of rupture of the amniotic sac, and the number of rectal or vaginal examinations in reference to surface bacteria, we found there was no definite relationship. The presence of a vaginal discharge in the mother was associated, almost invariably, with a considerable number of colonies in the first plate cultures taken from her baby.

adiposity of the trunk type. Urine examination shows no follicular hormone but follicle-stimulating hormone is present. Curettage on Jan. 9, 1933, and numerous biopsies since have persistently shown cystic and glandular hyperplasia. Moderately intensive treatment with pregnancy urine extract converted the almost continuous flow into periodic bleeding but without accompanying change in the endometrium.



A.



B.

Fig. 3.—Case 2. J. L. Puberty bleeding, cystic and glandular hyperplasia of the endometrium. (A.) Cystic and glandular hyperplasia of the endometrium during active bleeding. (B.) Persistence of the same type of endometrium after fourteen months of amenorrhea. Treatment with large doses of follutein stopped the flow. The bleeding has not recurred, and it is now eighteen months since the last flow.

responding shift in uterine position. This theory was tested on patients confined to bed at the State Sanatorium at Oakdale.

SUBJECTS

Twenty-five women volunteered to serve as subjects. One of these who had an ovarian cyst (subsequently removed), another whose uterus had been operated upon previously, and three others who for various reasons were unable to maintain the prone position for longer than a few hours at a time were excluded, leaving a total of 20 satisfactory subjects (Table I). All of these women were suffering from

TABLE I. DATA ON SUBJECTS, INITIAL POSITION OF UTERUS AND CHANGES IN POSITION PRODUCED BY ALTERATIONS IN BODY POSTURE

Note that seven of the twenty women were found to have anteverted uteri at initial examination. Four of these lay habitually on side and/or abdomen, and two were permitted to be out of bed part of the time. Also note that the uteri of an overwhelming majority of the patients (80 per cent) changed position four times in response to changes in body postures.

IDENTIFICATION	AGE	SINGLE, MARRIED, DIVORCED	PARITY	UTERUS, INITIAL POSITION	HABITUAL BED POSTURE OF PATIENT	NUMBER OF CHANGES EFFECTED IN UTERINE POSITION
1. D. J.	23	S	0	Posterior	Had been lying on back prior to initial examina- tion	4
2. L. U.	28	S	0	Posterior		4
3. K. B.	23	S	0	Posterior		4
4. A. C.	24	S	0	Posterior		1
5. J. C.	27	M	0	Posterior	Side or back	4
6. A. L.	25	S	0	Posterior	Side or back	4
7. C. W.	24	S	0	Posterior	Side or back	4
8. M. A.	24	M	0	Posterior	Side or back	4
9. N. D.	29	D	0	Anterior	Side or abdomen	4
10. J. T.	30	S	0	Posterior	Side	4
11. W. T.	28	S	0	Posterior	Side or abdomen	4
12. M. H.	24	S	0	Posterior	None	4
13. C. N.	20	S	0	Posterior	Side or back	4
14. C. G.	33	M	7	Anterior	Side or back, up much of time	4
15. V. W.	31	M	2	Anterior		4
16. M. J.	23	M	1	Anterior	Side or back	4
17. M. F.	19	S	0	Anterior	Side or abdomen	4
18. K. T.	26	M	3	Posterior	Side or back	1
19. F. F.	22	S	0	Anterior	Side	0
20. G. O.	25	M	3	Anterior	Abdomen	0